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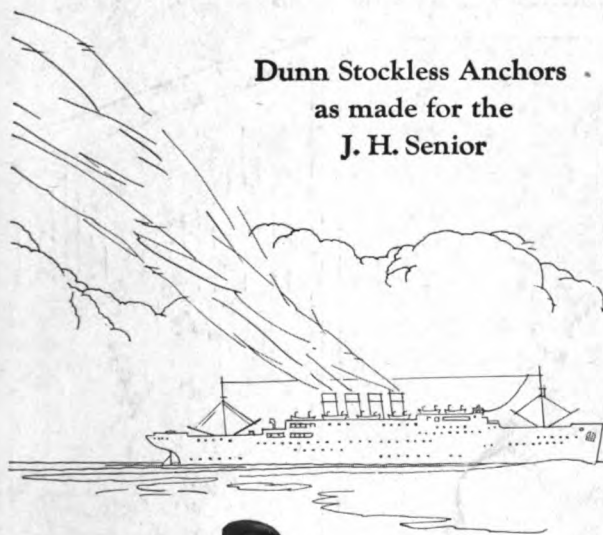
## AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

CHESTER, PA.

Dunn Stockless Anchors  
as made for the  
J. H. Senior



Dunn Stockless Anchors  
as made for  
the S. S. Leviathan  
Weight, 33,000 pounds



# Dunn Stockless Anchors

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# Why McGraw carries 25 men

**N**INE MEN are all that can play at any one time. The rest are insurance. A player may be injured—McGraw has a reserve supply. The turn of the game may require a pinch hitter—McGraw calls on the bench. It is this knowledge of his reserve forces that enables McGraw to play a winning game.

Oxygen for your day's needs is all that is necessary to run your plant. Your Linde contract is insurance. One oxygen plant may break down—Linde has a reserve supply. An increase in your business may require an excess of oxygen—Linde calls on any or all of its 115 plants and warehouses. It is this knowledge of Linde's reserve forces that enables you to be free from worry over oxygen—if you are a Linde customer.

## Linde uses its team

The Linde team of 115 plants and warehouses would be of little advantage to you if Linde did not play the game and use these plants and warehouses for you.



On one of the upper floors of the Carbide & Carbon Building in New York City the Linde Company has men who watch production and stock in every one of Linde's 115 plants and warehouses.



Unknown to you, Linde plants in Ohio are wired to supply some warehouse in New York or Pennsylvania; or Chicago instructed to ship to Detroit; and Detroit to Toledo.



Linde not only has the facilities to furnish its customers with a dependable supply of oxygen, but—it uses them.

## THE LINDE AIR PRODUCTS COMPANY

General Offices: Carbide & Carbon Bldg.

30 East 42d Street, New York

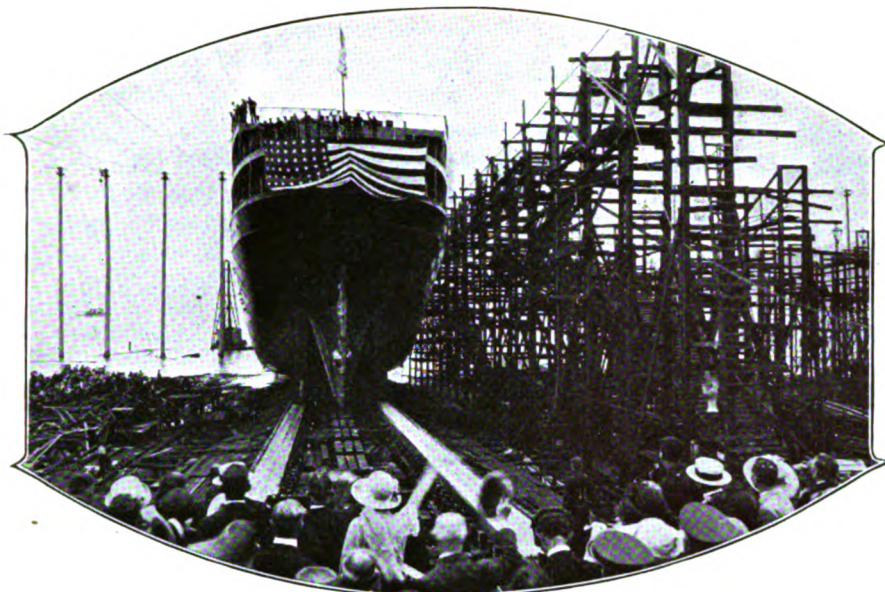
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# Marine Review

September

1924

## Bids Show Range in Diesel Costs

ON JULY 30 bids were opened by the general purchasing officer of the Panama canal for a total of three diesel engines having a capacity of 3750 brake horsepower each to drive 3125 kilovolt ampere generators, making a plant capacity of 11,250 brake horsepower or 9375 kilovolt amperes.

While this proposed installation should give great stimulus to high power diesel installations throughout the country for general power purposes, an analysis of the bids received and the number of them will shed some light on the diesel engine situation, as reflected in the marine field, which is far from encouraging.

In all, 10 firms submitted bids, nine domestic and one foreign. The latter will undoubtedly be ruled out because only do-

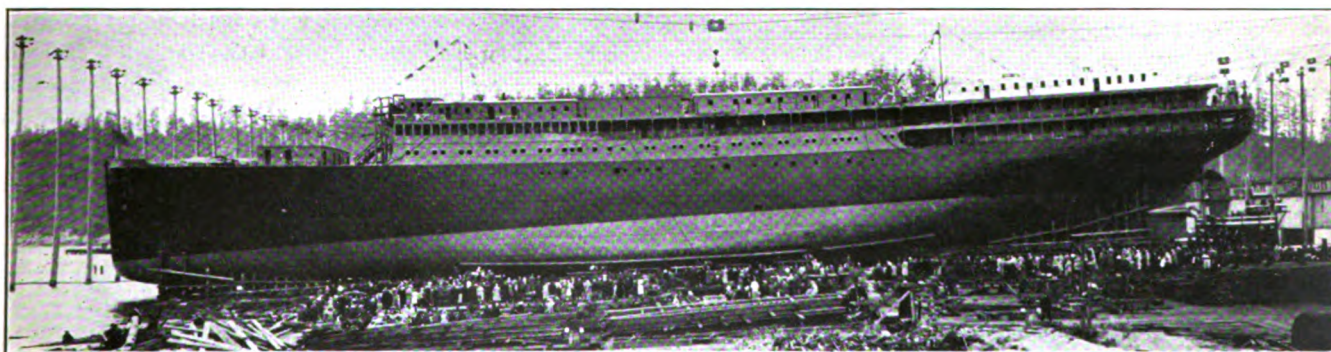
AFEW days ago came the first opportunity to compare on a cost basis the different types of diesel engines, 2 and 4-cycle, single and double acting, air and solid injection. Bids were taken for a large Panama canal installation and nine American diesel engine manufacturers competed.

Wide differences in ideas of costs were disclosed. The accompanying article is an analysis of the bids and of the reasons for this difference. The article was written by a diesel expert attached to one of the companies which bid on this contract.

mestic products will be allowed according to the specifications. The bid of the foreign company, however, adds interest and value to the comparison. All varieties of diesel engines were represented, including manufacturers of solid and air injection types

along with two and four cycle single and double acting as follows:

	Cycle	Per brake horsepower
1—Nordberg .....	2	\$ 55.10
2—Busch-Sulzer .....	2	58.25
3—Worthington, Double Ac. ....	2	58.50
4—Bethlehem .....	2	62.60
5—Burmeister & Wain, Double Ac. ....	4	65.65



LINER BIENVILLE READY TO LAUNCH AT TODD SHIPYARD, TACOMA, WASH. SHE IS ONE OF THE FINEST PASSENGER VESSELS EVER BUILT IN AN AMERICAN YARD

6—McIntosh & Seymour .....	4	66.35
*7—Falk .....	4	69.85
8—Nelseco, M. A. N., Double Ac. ....	2	78.45
9—Cramp-B. & W. Double Ac. ....	4	98.75
*10—Sun-Doxford .....	2	119.85

\* Solid injection.

The prices are for the bare engines stripped of all spares and represent the lowest combination for each make under the regular requirements of the bid. The speed range of the engines proposed is sufficiently close to eliminate a differential in price per brake horsepower due to a radical variation in weight.

Eliminating No. 5 from consideration and omitting the double acting for the moment, the above engines stand grouped as follows:

2-Cycle Engines	Per brake horsepower	4-Cycle Engines	Per brake horsepower
1—Nordberg .....	\$ 55.10	1—Mc. I. & S. ....	\$66.35
2—Busch-Sulzer ....	58.25	2—Falk .....	69.85
3—Bethlehem .....	62.60	*3—Cramp .....	98.75
4—Sun-Doxford ....	119.85	* Double acting.	
Av. of 1, 2 & 3 = \$ 58.65		Average of 1 & 2 = \$68.10	

Excess cost of 4-cycle over 2-cycle = \$9.45 or 16.10 per cent.

The shipbuilders have been eliminated from the average because they are so far removed from the others that they form a classification of their own and because due to peculiar conditions of shipyard operation, their manufacturing costs would not parallel those of purely diesel engine manufacturers with the exception of the Bethlehem company.

From the above, it is evident that all manufacturers are quite close in their own respective groups and if given a chance could have bid the same price without much disturbing their profit. This is the first time within our recollection that 2 and 4-cycle engine manufacturers have competed for the same job in sufficient numbers to allow a commercial comparison of prices and types, and the result cannot very well be disputed. The excess cost of the 4 over the 2-cycle is perhaps not as much as the latter's advocates would lead us to believe, but is there just the same.

Furthermore, the so-called cheapness of the solid injection engines in comparison with the air injection types due to the elimination of the air compressor does not appear to exist, both in the 2 and 4-cycle class. In each group, the solid injection engine is the highest in price with the exception of one 4-cycle type.

The double acting engines which by virtue of a greater output per cylinder and per unit of weight, all other conditions being equal, should be cheaper by at least 30 per cent, do not appear to be so. On the contrary, one in each group is also the highest in prices, excepting one shipyard.

The moral to be drawn from this analysis as affecting the marine field is that shipyards can not hope to compete with the manufacturers of diesel engines who confine themselves to that line only, unless the yards take stock of their facilities and segregate their diesel engine activities from the shipyard activities proper. They should divorce them from administration, overhead and other factors of the yard's un-

economical conditions and concentrate on manufacture not only for the marine but also for the stationary field.

It can not be conceived that in the approaching contracts for converting steamships to diesel drive, both by private owners and by the shipping board, this fact will be lost sight of. No owner of ships will willingly invest from 50 to 100 per cent more in a diesel plant built in a shipyard when he can get the equal products, and in many cases a better product made by a *bona fide* diesel manufacturer, for two-thirds to one-half of the price of the former.

Shipyards not willing so to divorce their diesel activities and put them on a sound manufacturing basis might as well close up shop as far as this product is concerned and purchase their machinery from the specialists.

Indicative of the progress being made by many competitors while American shipping companies are held back by governmental supervision, competition and opposition, is the statement in the P. & O. company's report that the average age of its ships is about seven years. The book value is £23 a ton and if the reserves were deducted the figure would be £11 a ton. Ranking the company's investments at their market value instead of their book value, would reduce this book value of the fleet still further. Lord Inchcape places the replacement value at £36 to £40 a ton.

The company put four new mail steamers into commission in the Australian service the past year; has contracted for four 15,200-ton gross ton steamers for the London-Bombay mail service, one steamer of 10,000 tons gross for the Bombay-Aden trade, three 15,000 gross ton passenger and cargo ships for the Australian trade and one small feeder cargo steamer for service in the Singapore district.

Records of the department of commerce disclose some interesting sidelights on shipping conditions. Scrapping of ships during the past fiscal year ended June 30, was heavier than new construction bringing about a very slight reduction in the world's total fleet, seven-tenth of 1 per cent. Idle tonnage decreased 24 per cent, of which the majority represents ships brought into commission during the improved freight movement last fall. In the last six months of 1923, the idle fleet decreased by 1,157,000 gross tons. In the first six months of 1924, the idle fleet dropped by 763,000 gross tons, a total of 1,920,000 gross tons for the year. Privately owned American ships in idleness decreased by 229,000 gross tons in the first six months of this year, the largest reduction made by any nation. Great Britain was second with a reduction in her idle fleet of 209,000 gross tons. The index figure on charter rates was 110 in the second quarter of this year, 111 in the first quarter, 107 in the closing quarter of last year and 104 in the third quarter of 1923. The basis of 100 is the 1911-1913 average.

About 100 bulk freighters are idle on the Great Lakes, representing around 25 per cent of the fleet. Slackened demand for iron ore has kept the lake fleet operating at a comparatively low level all year. The volume of coal moved has been only fairly heavy but the fall shipments of grain promise to be moderately large.

# Solve Unusual Lifeboat Problem

Engineers Meet Need for Lifeboat Capacity  
for 1500 Persons on 300 - Foot Ship

COMPLETED in July, 1924 by the Los Angeles Shipbuilding & Drydock Co., San Pedro, Cal., for the Wilmington Transportation Co., to carry passengers, automobiles and package freight between Los Angeles and the Catalina islands, the steamer CATALINA is a splendid practical example of the special types of vessels needed to meet unusual conditions of service.

When it was found that the existing means of transportation were inadequate to meet the demands of a rapidly growing business, the management decided to build a new vessel designed to incorporate in every detail all special features which experience had shown would insure the greatest possible comfort and safety for passengers. This vessel is built of steel, single screw with a reciprocating triple expansion steam engine of 3600 indicated horsepower and oil burning. The dimensions are 301-foot length, 52-foot beam and 21-foot depth. The main or lower deck projects out from the sides of the hull to give a desirable width of deck and roominess of accommodation in the superstructure.

MARINE REVIEW for April, 1924, had an illustrated description of this vessel.

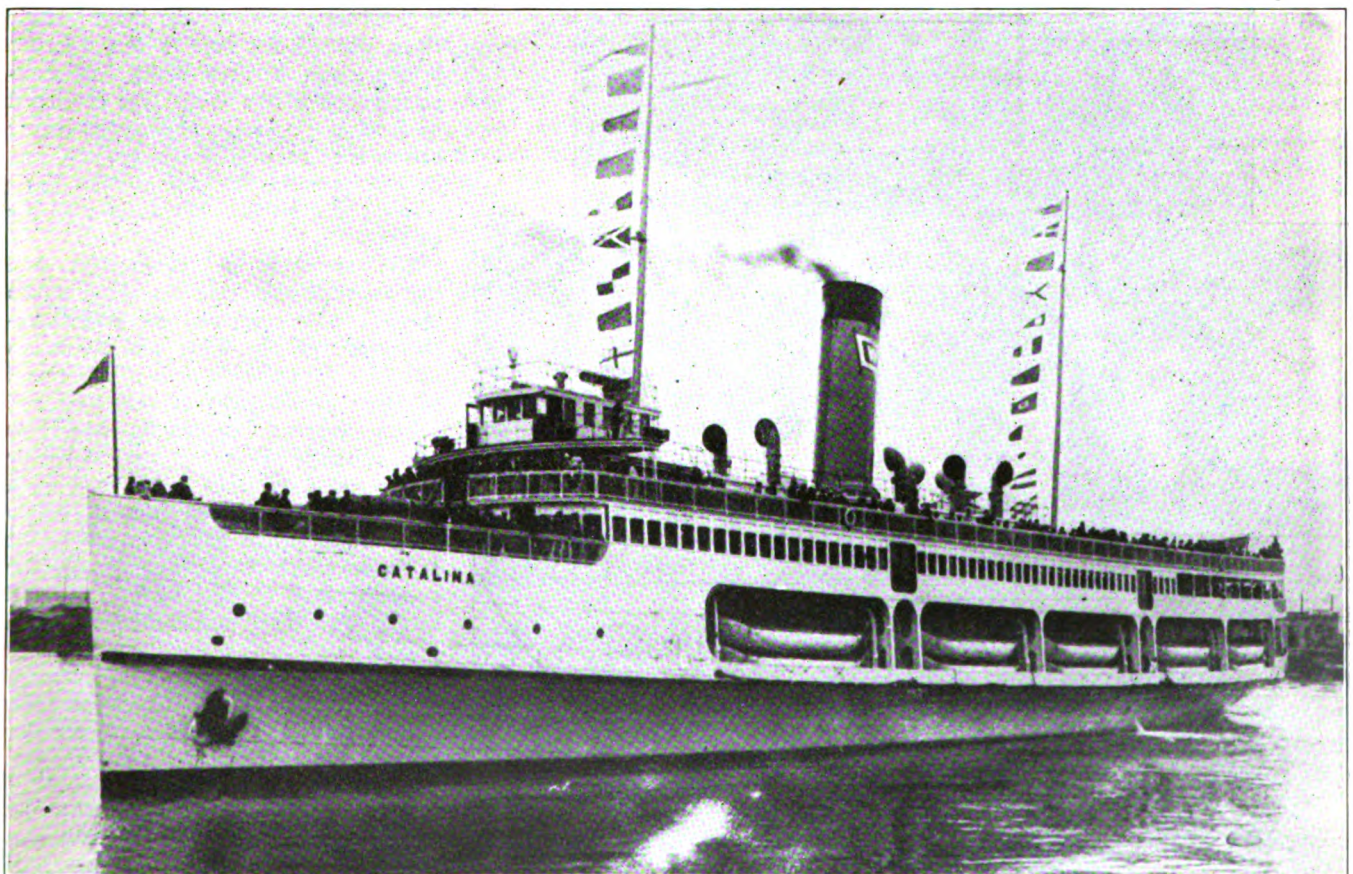
One of the most interesting of the special features, unique in conception and execution, is the unusual arrangement of the life saving equipment. Though the run from the harbor of Los Angeles to the Catalina islands is only 25 miles, it must be classed as an ocean voyage and consequently the United States steamboat inspection service requirements for lifeboats and davits are exactly similar to those for an ocean liner. This means that a sufficient number of lifeboats under mechanically operated davits must be installed to give a total capacity to accommodate all persons on board.

## Need Many Lifeboats

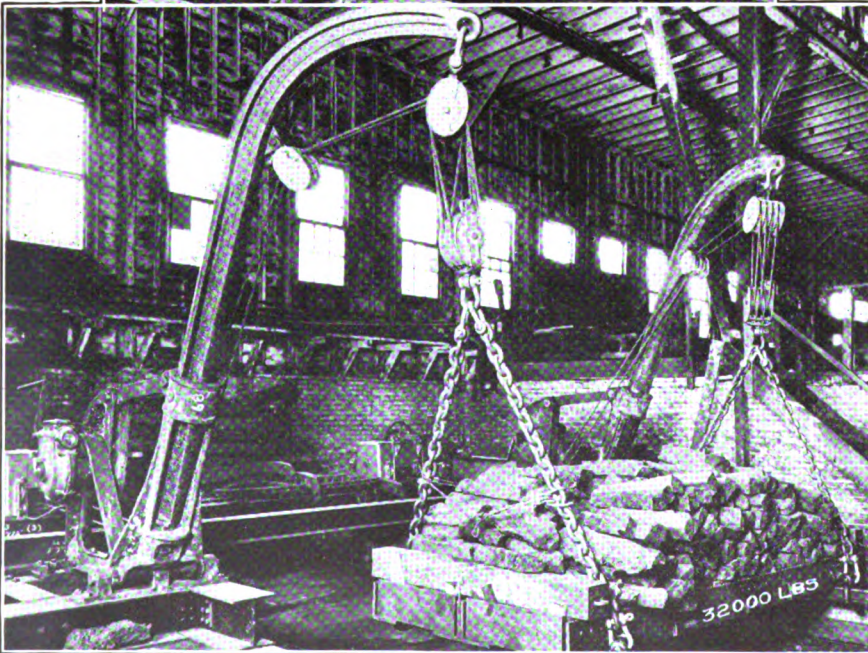
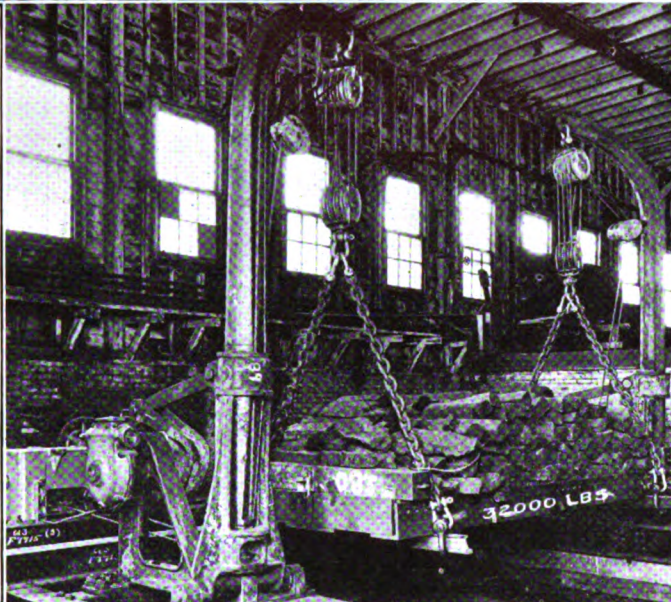
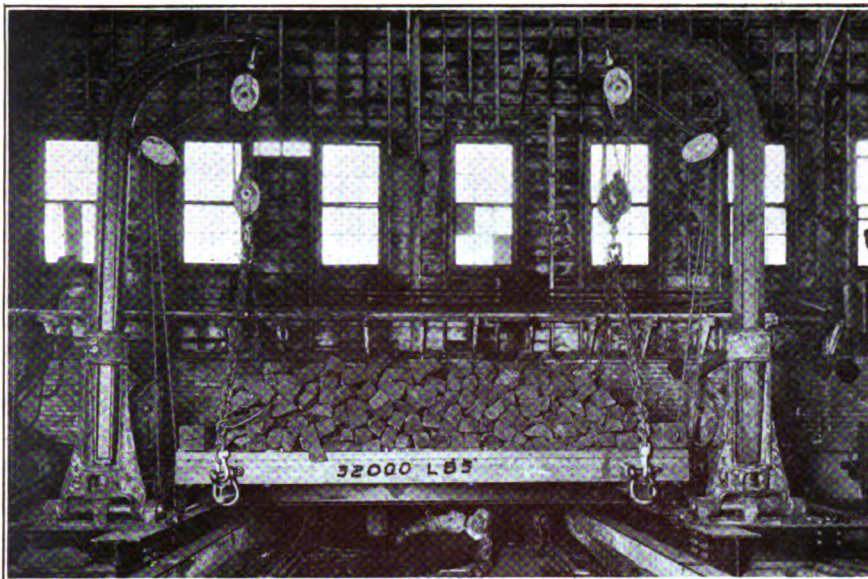
On ocean going vessels making long runs, the number of passengers of course is limited by the available space for cabins and berths and at the same time the dimensions are proportionately greater so that the deck space as a rule is sufficient for carrying the necessary lifeboats. In the case of the CATALINA, a

run of short duration is made and consequently in proportion to her dimensions a much greater number of passengers can be comfortably carried. This vessel is, in other words, a sort of ferry, but operating in ocean waters and, therefore, subject to the ocean requirements for life saving equipment on a passenger ship.

Estimates showed that around 1500 persons could be accommodated with comfort and consequently lifeboats of a total capacity of this number were required. Obviously, lifeboats to carry this large number could not be accommodated in the deck space available without going to very large units and using the nesting principle, that is, placing one boat directly over another. The owners, therefore, came to the conclusion that the best way to solve the problem was to use 30-foot, 76-person, Lundin decked type of lifeboats in nests of two each, one above the other, and to place five such nests on each side under mechanically operated davits. This gave a total lifeboat capacity in 20 such boats for a maximum of 1520 passengers.



HOW LIFEBOATS ARE CARRIED ON PASSENGER SHIP CATALINA



TESTING NEW LIFEBOAT HANDLING EQUIPMENT

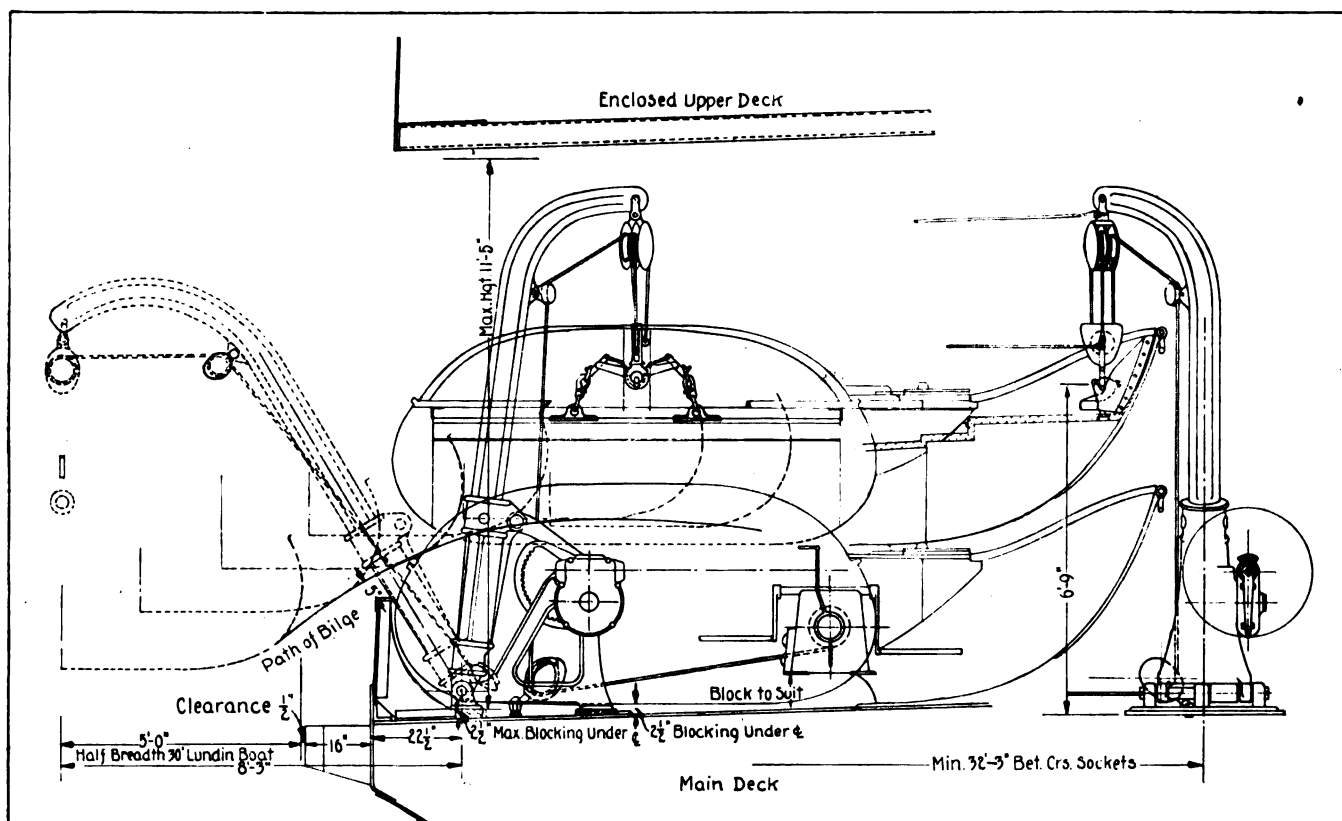
To place this number of very large lifeboats, necessarily of great weight, on the uppermost or boat deck was extremely undesirable for two good reasons. First, with the size of the vessel, the amount of superstructure and extended decks, the stability would be seriously affected. Second, with nests of large lifeboats on this deck, it would be made useless as a delightful, roomy open space for passengers to promenade and rest. To overcome these difficulties, it was decided to place the nests of lifeboats as shown in the accompanying illustration of the vessel, on each side on the main deck, or what might be termed in 'tween decks, with the sides of the vessel, excepting a solid steel bulwark, open in way of the boats. Inboard between the boats and a fore and aft steel bulkhead enclosing machinery and accommodation spaces, is a passage on each side to admit of access to the lifeboats on this deck.

#### Davits of Special Type

Having decided on the type of boat and where to place them, it was necessary to obtain mechanically operated davits by means of which the boats could be quickly and safely launched with a minimum of effort. This problem was put up to the Welin Boat & Davit Corp., 305 Vernon avenue, Long Island City, N. Y., the builder of the boats. The usual quadrant type of davit could not be used on account of the limited headroom, which is not over 11 feet, 5 inches in the clear, between decks. A semi-rotary davit of the Welin type developed by Axel Welin in England, though never before built or used in this country, was decided upon as the only possible davit which would satisfactorily accomplish the purpose.

The accompanying illustrations and the drawing, show the completed davits in pairs under test, and the general arrangement of the boats and davits as installed. The davit arm is of the round bar type though it is of cast steel and a heavy rounded I-section in shape. This arm is stepped in a cast steel sleeve or socket and rests at its lower point on a hardened steel, convex shaped button upon which, while guided in the socket at the top and bottom, the arm turns. The outboard base of the davit is a steel casting with three lugs through which a finished steel pin passes, serving as a hinge for the socket and as the outboard support for the frame. The upper part of the socket is connected to an annular geared rotating circular segment of cast steel, by a link of wrought steel.

A triangular steel casting with inboard base bolted to the deck and outboard lower end pivoted on the pin about which the socket rotates, supports the annular geared circular segment by



DESIGN OF SEMIROTARY DAVIT FOR HANDLING LIFEBOATS ON LINER CATALINA

means of a steel pin through a boss at its top. This frame also carries on a shaft through a second boss just below, a spur gear, meshing with the annular gear of the rotating segment, on one end, and a worm gear of cast iron and worm of bronze enclosed in a grease tight cast iron casing on the other.

#### How Davit Is Operated

To operate the davit, a hand crank fitted to the squared end of the worm shaft emerging inboard from the grease tight casing referred to above, is rotated. This in turn actuates the worm wheel thus transmitting motion to the small spur gear in mesh with the annular geared segment. In this way the annular geared segment connected with the socket, holding the davit arm, by means of the wrought steel link, is rotated about the pin in the boss at the top of the frame through a sufficient arc to move the davit from its inboard position over the boat, chocked on deck, to the extreme outboard position with the boat ready to lower into the water.

For the limited space, particularly in head room, and the extremely heavy working loads under which they would be called upon to operate, this type of davit was found to be especially well suited.

The government through the steamboat inspection service, with the lives of passengers and crew at stake, exercises the most rigid supervision over the material and workmanship of davits

and lifeboats. In the case of davits of well known types previously installed, the arms are tested at the plant to double the load they are to carry. Tests on completely assembled sets are not required until they are installed on board. However, for the new type of davit described, never before installed on shipboard in this country, it was required to test the completely assembled davit at double its working load.

The Welin Boat & Davit Corp. fully realizing the importance of insuring ample strength and completely satisfactory operation, assembled the davits in sets and installed them on a special testing platform under conditions exactly similar to their use on board. While in their inboard position, a steel frame platform loaded with pig iron to a total weight of 32,000 pounds, just twice the weight of the boat with 76 persons at an average of 140 pounds per person, was swung from the davits through steel falls and over upper and lower blocks and lead blocks similar in every respect to the manner in which the lifeboat is attached on board. Each davit was then cranked out simultaneously until it was in the extreme outboard position, with sufficient outreach to clear the lifeboat of the side of the vessel. After this, over and above the requirements, the davits were cranked inboard bringing the load back to its original position.

The tests showed that the davits are amply strong enough to take care of twice the maximum load that they

will be called upon to carry on board ship. The operation of turning them out and bringing them back was carried out with comparative ease and rapidity. For the installation on board, all the lifeboats are fitted with improved Mills type releasing gears and wire falls. Special nontoppling steel blocks with patented stabilizers made by W. H. McMillan & Sons, 153 South street, New York, for the Welin company, were also furnished.

#### Use Boat Winches

Owing to the size of the lifeboats, their location in 'tween decks and a bulwark outboard 30 inches high from the deck, it was decided that some mechanical means be supplied for raising and lowering the boats. For this purpose, one hand operated boat hoisting and lowering gear as manufactured by George A. Vaughan & Co., Putnam, Conn., was furnished for each nest of two boats.

This winch is essentially a single subdivided drum, to each half of which is attached the wire falls carried over fair lead blocks from each davit. The drum is operated by turning a hand crank on the end of a worm meshing with a worm wheel keyed to the drum shaft. When hoisting the boat, a simple clutch holds the boat in any position. When lowering, the clutch is thrown out and control is maintained by means of two band brakes applied to the drum ends. The brakes are applied by means of blocks and light manila rope carried

over fair leads and may be eased off from cleats in the vicinity of each davit on deck or from cleats at each end of the boat itself. If desired instead of a hand crank the hoisting and lowering gear may be operated by a small electric motor through suitable gearing.

This installation of lifeboats and davits on a 300-foot vessel to accommodate 1500 persons, is a fine example of engineering and mechanical ability. It shows that in spite of the present low level of shipbuilding in the country, engineering specialists are fully qualified to furnish practical and efficient equipment to meet any reasonable requirements.

### Board Orders Operators To Sign Agreement

Study of the new managing operators' agreement drafted by the shipping board has shown a wide difference in opinion between the board and the operators. The board wants to set a fixed commission, with the operators assuming various expenses previously paid by the board. In line with its policy of in-

sisting that the operators sign the new agreement and ask for modification after actual service has shown how the agreement works, the board in July adopted the following resolution:

WHEREAS, the president of the Fleet corporation has advised the shipping board that the new form of contract recently recommended by the Fleet corporation to be applied in ship consolidation in the different trade routes has been presented to the operators concerned for consummation, and

WHEREAS, the president of the Fleet corporation further advises that the operators are reluctant to execute the said agreement as submitted, and

WHEREAS, the president of the Fleet corporation now recommends to the shipping board that the operators chosen for the consolidated routes be required to sign such agreements forthwith; and that after a reasonable time any operator who feels that sufficient reason exists for readjustments of certain provisions in the contract may submit such request to the Fleet corporation for consideration and for any appropriate action

based thereon.

THEREFORE, BE IT RESOLVED that the recommendation of the president of the Fleet corporation as herein outlined is approved and made the action of the board; and in event any agent chosen for a consolidated route does not sign within 10 days, the Emergency Fleet corporation is directed to appoint another managing agent agreeable to the board to whom said contract is agreeable.

PROVIDED FURTHER, that after the consummation of the said agreement the president of the Emergency Fleet corporation may in his discretion delay action against the operator for a period of 30 days due to technical violations of paragraph 18 of said agreement which might appear to exist, pending adjustment and ruling thereon.

Paragraph 18 of the managing operators' agreement, referred to in the board's resolution, prohibits the operation by the managing agents of subsidiary companies for furnishing supplies or stevedoring.

## Montreal Stops Pilferage Evil

MONTREAL is one of the ports which have succeeded in practically suppressing the pilfering of cargo. Its achievements in this connection are of considerable interest, more especially as the lay-out of its docks is not as favorable to effective preventive police work as the lay-out of the usual dock property in Europe. Most British and European docks are surrounded by prison-like walls pierced by two or three gates, which are always well guarded by police and customs officers. The Montreal docks extend for miles along the river front and are only separated from the city by a revetment wall designed to serve as a levee against spring floods. This wall is pierced by a score or more of gates, and over it an active man may vault at almost any place.

Yet while shipping companies are holding conferences to consider means of overcoming the aggravated pilfering evil in European ports, and European merchants are shipping right foot shoes in one consignment and their left foot mates in another consignment, the last cargo of liquor delivered in Montreal was landed from the ship and checked out of the sheds without a single claim for damages arising during the time the consignment of 158,000 cases was under the observation of the harbor police. Of course broken

cases were found in the cargo, but the police were able to certify that all the damage had been done by bad stowages or the acts of longshoremen on the other side of the Atlantic.

Until comparatively recently many longshoremen when discharging a cargo of liquor always made a practice of sampling their favorite brands. They contrived by accident or design, to drop a case with sufficient force to smash the bottles in it; and then to drain the liquor from the case into their dinner pails or drinking mugs. Usually they repeated the performance until they became so muddled that they broke more cases by accident than by design. They rather regarded the privilege of getting drunk as a legitimate perquisite of the job of unloading a liquor cargo.

But the old days of free drinks have passed away. Now when a liquor cargo is being discharged a dock policeman is stationed in the hold. He watches the breaking out of the cargo, and if any case is damaged or looks as if it had been tampered with he sees that it is laid to one side until the cooper can attend to it; then with the cooper he checks up the damage, and makes a note of it in a book provided for the purpose. If a case is broken, the policemen in the hold or in the shed sees that nobody is allowed

to collect liquor in a pannikin from a leaky case. On this point the police are firm. The consequence is that the longshoremen have abandoned the practice of breaking liquor cases by design, and rarely break one by accident, as the discharge of 158,000 cases from one ship without any damage shows.

Some time after its formation, the Montreal harbor commission, a board appointed by the Dominion government though usually nominated by the business interests of the port, decided to organize its own police force. Prior to that time, the city controlled the policing of the docks, a plan which the harbor commission had good reason to regard as unsatisfactory. The harbor commission wanted men trained in dock work and under the system of city control, policeman might be on duty in the docks one day and then spend a week or so guarding nurse maids in remote suburbs. So it secured power from the Dominion government to organize its own force which to all intents and purposes has a status comparable with that famous body of Dominion police, the Royal Northwest Mounted Police, and are under a similar discipline.

But to serve the interests of the port, the harbor commissioners have placed upon their police force a variety of special duties not always associated

with police work. When, for instance, a shipping company has a cargo of liquor or other goods, liable to the attention of pilferers to discharge or load, it asks the dock police department to assign certain police to keep an eye on the work and protect its interests.

Thus when a valuable cargo is being handled there is usually a uniformed policeman in the hold, another in the shed, and probably another on the gangway. They check and report all damaged packages, see that longshoremen do not profit by accidents, and in effect officiate as boss stevedores, checkers, customs officers and preventive police. If a valuable cargo is held in one of the sheds, harbor police are supplied to watch it on application of the shipping company concerned. Practically all the shipping companies avail themselves of this special service with the exception of the Canadian Pacific railway, which has its own dock and railway police force, mainly composed of men of long service with retirement pension rights which cannot be ignored.

The shipping companies generally consider that the harbor police render a better service than they could secure from police or watchmen. Under the old system the question was often: Who is watching the watchmen? But under the present system captains of the harbor police visit at irregular hours, day and night, all sheds or points where harbor policemen are employed on special duty as well as the men employed on general duties. The harbor commission of course charges the transportation companies a sufficient sum to cover the cost of the special services rendered by its police. As a rule more than half of the harbor police during the season of navigation are employed in special work, paid for by the transportation companies.

Undoubtedly the transportation companies regard the harbor police force much more efficient for its purpose than the old, isolated private police and watchman. When they seek the service of the harbor police, they know they are getting men trained for the work required of them, men in whom there is a steady development of l'esprit de corps, and men who are developing a tradition of service and a habit of authority not easy for private police or mere watchmen to acquire.

Another special duty of the harbor police of Montreal is to examine the seals of all railway cars entering the dock area, no little job, as the harbor commission operates sixty miles of railway tracks and shunts more than

200,000 cars a year in the dock yards.

How has Montreal been able to reduce pilfering, which some years ago was a very serious evil, to insignificant dimensions? This question was put at different times to the secretary of the Montreal harbor commission, and to Colonel Williams, chief of the harbor police, a veteran of the world war, and former chief of the old Intercolonial railway police force. Both officials made about the same answer, and that answer was:

"There is no royal road to reform. Some years ago, pilfering was a very serious problem here. Today complaints are few. Of course, there is still some pilfering, but there is no organized pilfering and the losses are small. Similarly we have some smuggling, but it is quite small, compared with years ago, apart from dope smuggling, a very difficult problem we are always up against.

"But, by and large, there has been a big improvement in conditions in this port, as respects pilfering and smuggling, and this has been brought about partly by the improvement in the general organization of the whole port establishment, and partly by the improvement in the organization of the harbor police, their training in special and general dock work and the increased proficiency which experience gives.

"In the old days, the longshoremen were accused of being enterprising pilferers; possibly they were, because pilfering opportunities were often left wide open. But today the harbor police have little or no cause to complain of the longshoremen. As our men took over the jobs of private watchmen, who were often lax, and put the lid on, so to speak, the longshoremen accepted the new order of this in a proper spirit. Many of them assisted the police to curb the pilfering propensities of the few among them. The harbor policemen had a job to do, and as soon as it became evident that he was going to do it to the best of his ability, he earned the respect of the longshoremen, and very often their co-operation.

"Such pilfering and smuggling as may persist in the port of Montreal is done almost entirely by the white collar people. Our police keep a close watch on people who come into the docks in automobiles, because we have learned that among them are mostly the people who, by collusion with people on the ships or in the employ of the shipping companies get away with most of the dope smuggled or pilfered goods.

"At the dock gates of a port like Southampton there are usually three

to six policemen and as many customs officers watching the automobile and foot passenger traffic in and out, keen to examine a man's dinner pail or a suspicious bulge in a man's clothing. It is impossible to exercise a similar supervision here because the entrances to the docks are numerous with wide spaces where there is no revetment wall at all. But we are able to keep men on watch for parties trying to avoid passing through the regular gates with a parcel for which they have no proper permit; and by holding up dock workers with dinner pails for examination of their contents we have practically established the condition that all workers inside the docks bring their meals in paper parcels."

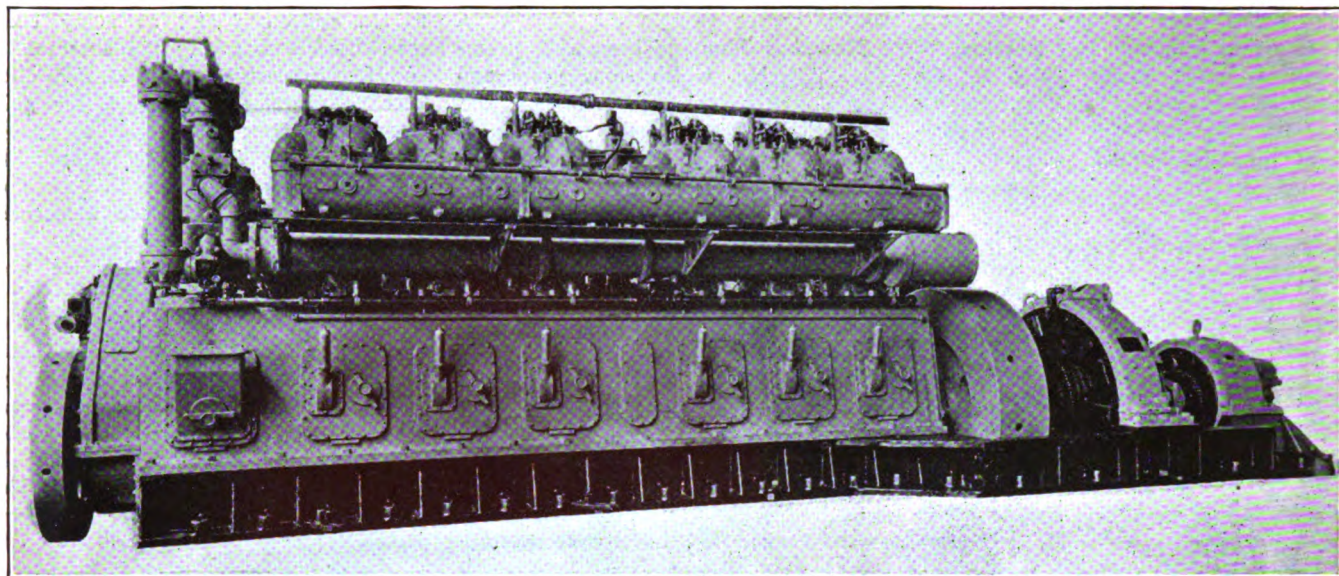
## How Oil Heaters and Coolers Are Used

*To the Editor:*

Kindly describe the function of oil heaters and air coolers.

Oil heaters, generally in pairs must be used on every steamship burning fuel oil and also on diesel engine ships. Heaters are generally cylindrical in shape, of cast iron and have steel tubes inside. As fuel oil comes from the settling tanks in the engine room, it is passed through these heaters and is heated to the requisite temperature, which is some times as high as 300 degrees Fahr. by means of steam passed through the heaters. The steam and oil must under no circumstances come into contact with each other. This, of course, means that the steam will be on one side of these steel tubes and the oil on the other side. The heaters are located in the line between the settling tanks and the furnaces of the boilers.

Oil coolers are similar in general appearance to oil heaters but generally much larger and are used particularly on reduction geared ships where large quantities of lubricating oil are used for such gears. The gears are in a casing which is oil tight and they run in oil. The oil is supplied to this casing as a rule by gravity from tanks in the upper part of the engine room. When the ship is under operation and this oil comes into contact with the gears it becomes heated. It is drawn off from the casing into a sump tank where the impurities are separated from it. The lubricating oil is then passed up through coolers and in turn to the reservoir tanks in the upper part of the engine room. It is necessary to cool the lubricating oil so that it will regain its properties as a lubricant. These coolers generally have coils and salt water from the sea at, of course, comparatively low temperature, is passed through these coolers for the purpose of cooling the lubricating oil.



Diesel Engine Which Drives New Railroad Tug

## Railroad Builds Diesel Electric Tug

ON AUG. 20, the Pennsylvania railroad, through F. L. Dubosque, superintendent of floating equipment, invited a large number of representative marine men to attend an inspection and trial of the new diesel electric tug P. R. R. No. 16. The party embarked at the foot of Thirty-seventh street, New York, and went up the Hudson river and back, the trials lasting about an hour and a half.

It was clearly demonstrated that the flexibility of control is perfect. The helmsman in the pilot house can vary his speed throughout the entire range from full speed ahead to full speed astern at his own will and practically instantaneously. The tug can be brought from full speed ahead to stop in less than 30 seconds. The following general dimensions and descrip-

tion of the tug furnished by Mr. Dubosque and the accompanying photographs will give a comprehensive idea of this new departure in tug boat building:

Length, overall ..... 105 ft. 0 ins.  
Beam, molded, ..... 24 ft. 0 ins.  
Draft, ..... 12 ft. 0 ins.  
Displacement ..... 340 tons

The hull, including the waist, fenders and superstructure is built of steel. The motive power is furnished by two Winton type full diesel engines, 4-cycle, each having six cylinders,  $13\frac{3}{4}$  inches in diameter, 18-inch stroke, rotating continuously in one direction and automatically governed. The engines are started by air and one engine can be started electrically if the other is operating. Each engine is directly connected to a Westinghouse, direct current shunt wound generator,

rated at 235 kilowatts at 250 volts, and has attached to it a 25 kilowatt compound wound exciter. The generators in series furnish current for the propelling motor, and exciters, in addition to excitation, furnish current for all the auxiliaries on the boat.

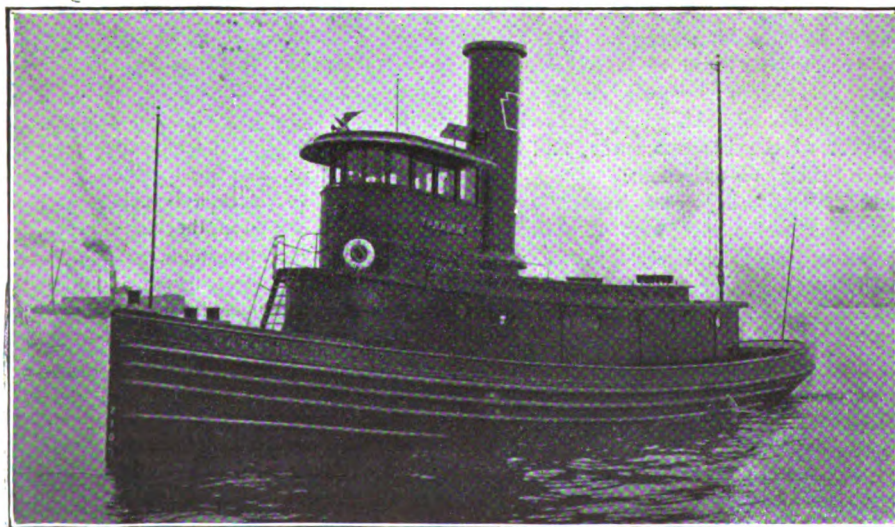
### Control of Motor

The propelling motor is of the shunt wound, double armature type, rated at 575 horsepower at 500 volts and 125 revolutions per minute. The propeller is cast iron, 9 feet, 6 inches in diameter, 9-foot 4-inch pitch.

The rudder is controlled by a motor driven steering machine of the simple hoisting type, and the pilot house control is of the non-follow up system.

Light is furnished by storage batteries, automatically charged by a motor generating set. The boat is heated by passing air around the muffler attached to the exhaust pipes of the main engine and then through ducts to the location desired. An electric fan is used to circulate the air. The whistle is sounded by compressed air taken from the second stage air compressor on the main engines.

The rotative speed of the motor is controlled on the Ward-Leonard system of variable generated voltage, so that any speed from zero to the maximum can be instantly obtained by the appropriate movement of a lever on a control stand. The maximum speed the boat attained was 13.52 statute miles per hour, when 646 horsepower was delivered to the propeller shaft, and revolutions of propeller were 133 per minute. When towing, a speed of 6.36 miles per hour was at-



NEW DIESEL-ELECTRIC RAILROAD TUG IN NEW YORK HARBOR

tained with a stress on the towing hawser of 15,180 pounds, at which time 629 horsepower was delivered to the propeller shaft, and revolutions of propeller were 117 per minute.

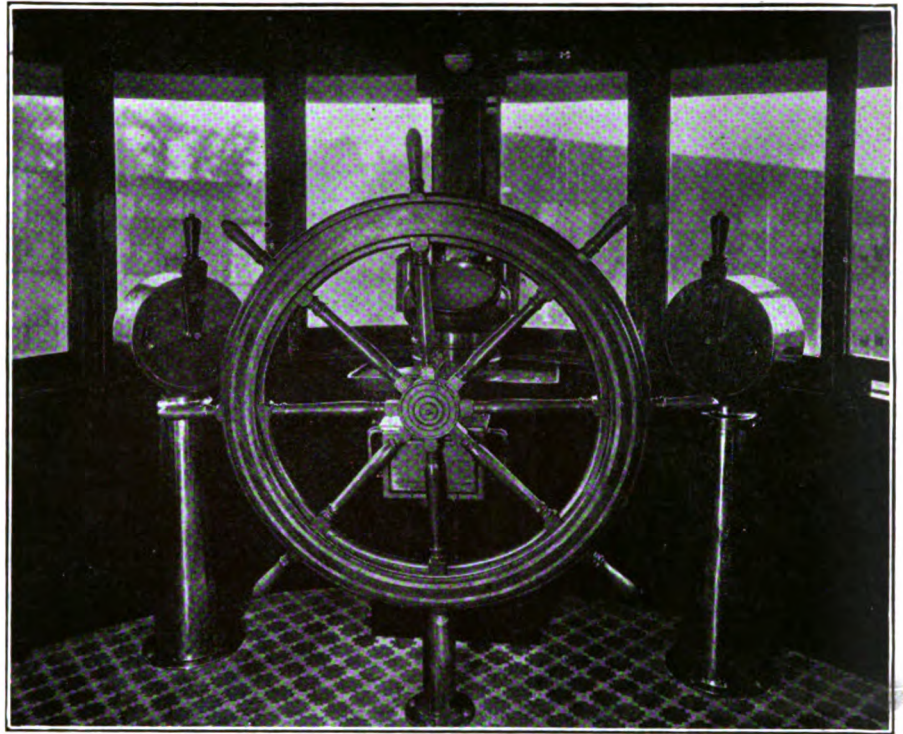
The work this type of tug performs is such that she can operate a large part of the time on one generating unit. Under this condition, the light speed is 11.25 miles per hour and the towing speed 5.10 miles per hour, with hawser stress of 9500 pounds and 328 propeller horsepower.

The rotation of the propeller wheel is controled directly by the pilot. Two control stands similar to annunciators are fitted on either side in the forward end of the pilot house, and the levers act in unison.

The hull was built by the Staten Island Shipbuilding Co., New York, the engines by the Winton Engine Co., Cleveland, and the generators, motors and other electrical equipment by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. These parts were assembled and installed and the boat was fitted out at the Hoboken shops of the Pennsylvania system. She was completed on July 8 and placed in service towing barges and floats on July 14.

Credit should be given to F. L. Dubosque, superintendent of floating equipment of the Pennsylvania railroad for his attitude in giving everyone interested in the development of this diesel electric tug the opportunity to inspect her and to see her in operation.

Construction activity at the Puget Sound navy yard is expected in the near future as \$250,000 is available since July



PILOT HOUSE SHOWING ELECTRICAL CONTROL OF SPEED OF DRIVING MOTOR BY WHICH TUG'S SPEED AND DIRECTION IS CONTROLLED WITHOUT SIGNALLING ENGINE ROOM

1 for a new dock and fitting out pier. This terminal is planned to be the largest and most efficient in the United States. Its complete cost will be \$1,900,000 covering expenditure over a period of three years. Congress has also provided funds for a central power station at the yard as well as \$435,000 for the Puget Sound torpedo station at Keyport.

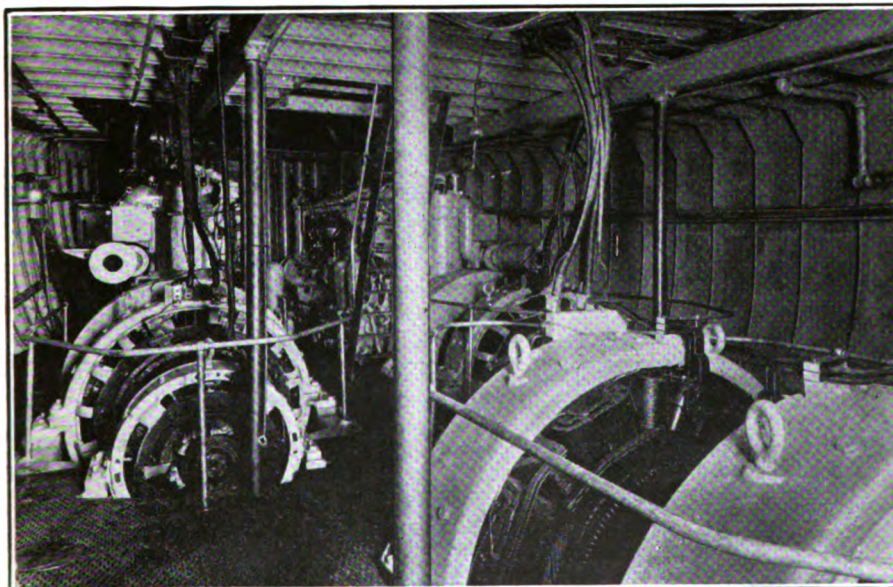
Having ended her long career in government service, the former cable laying steamer BURNSIDE has been towed to San Francisco to be broken up for junk.

The BURNSIDE was the first vessel captured by the American forces in the Spanish-American war, at that time being known as the RITA. She was used as a transport to the Philippines for some time but for the last 20 years she was stationed on Puget sound for cable work, most of it in Alaskan waters. Last year, the BURNSIDE was replaced by the new steamer DELLWOOD and the government sold her as she was obsolete.

Strenuous protest has been made against the decision of the Pacific westbound conference lines to refuse to absorb wharfage charges on local bills of lading. On through bills of lading, the practice is for wharfage to be paid equally by the water and rail carriers, this applying to both import and export. Under this arrangement, the steamship companies paid half of the wharfage also on local freight the consignee absorbing the rest. The recent decision is held to work a hardship upon local shippers. The new ruling became effective July 1.

Surveys and hearings are being held by the port of Kelso, Wash., before it is definitely determined where the proposed port terminals are to be placed. This enterprising city has decided to construct modern ocean terminals but there is a difference of opinion among experts where the port shall be located.

Bartholomew Jacob, at one time a shipbuilder at City Island, New York died in Texas, Aug. 3, aged 51.



LOOKING FORWARD IN ENGINE ROOM ON RAILROAD TUG SHOWING TWO ENGINES WITH GENERATORS ATTACHED AND MAIN DOUBLE ARMATURE DRIVING MOTOR

## Pleased with Trade on Round the World Line

R. Stanley Dollar, president of the Admiral Oriental Line and vice president of the Dollar Steamship Line, sailed Aug. 16 from San Francisco on the third round-the-world trip of the Dollar liner *PRESIDENT HARRISON*. He will be gone five months, visiting 72 offices of the line's round-the-world service. Before sailing he said:

"The first six months of the round-the-world service of the Dollar Line has shown gratifying results in both passenger and freight business. Both the American tourist and shipper have evinced

a desire to support a privately owned American merchant marine. The encouraging response seems to justify an optimistic view of the future. From its inauguration, in January, the growth in passenger and freight patronage has been steady. Under the existing world conditions the freight movement from the Orient, Philippines and Straits Settlements may be conservatively regarded as satisfactory. Intercoastal and outbound trade from the United States to the Orient has slackened somewhat, especially with Japan, where trade has been affected by the luxury tax recently imposed in that country, and, in a lesser degree, through the immigration act.

## Sell Yard Where Famous Yachts Were Built

The famous boat building establishment of Herreshoff, located in Bristol, Conn., was auctioned off on Aug. 21 under a voluntary liquidation sale. The Herreshoff name is especially famous in connection with the design and building of yachts as cup defenders, the Herreshoffs having a natural genius for this type of design. Many fast-powered vessels of considerable size were also built in their yard. At one time a number of torpedo boat destroyers were constructed for the United States and foreign countries. The yard shut down some time ago.

# Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to Aug. 21, 1924, on Future Loadings

NOTE: FREIGHT RATES STEADY WITH SLIGHT CHANGES ON SOME COMMODITIES

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	100 lbs.	††Finished steel	REMARKS Freight Offered	From North Pacific Ports to	Lumber Per m. ft.
Liverpool....	1s 9d†	\$0.50	\$0.35	\$0.17	\$0.40	\$0.75	\$7.00T	Good	San Francisco.....	\$4.50 to 5.00
London.....	1s 6d†	0.50	0.35	0.17	0.40	0.75	7.00T	Good	South California.....	5.00 to 6.50
Christiania...	\$0.12	0.45	0.40	0.26	0.42½	0.85	8.00T	Quiet	Hawaiian Islands.....	9.50 to 10.50
Copenhagen...	0.12	0.45	0.40	0.26	0.42½	0.85	8.00T	Quiet	New Zealand.....	11.00 to 13.00
Hamburg.....	0.09	0.35	0.32½	0.16	0.37½	0.75	8.00T	Improved	Sydney.....	11.00 to 13.00
Bremen.....	0.09	0.35	0.32½	0.16	0.37½	0.75	8.00T	Improved	Melbourne-Adelaide...	11.50 to 13.50
Rotterdam and Amsterdam.	0.08	0.32½	0.30	0.15	0.35	0.70	7.50T	Quiet	Oriental Ports.....	6.00 to 8.00
Antwerp.....	0.08	0.32½	0.30	0.15	0.35	0.70	7.00T	Improved	Oriental Ports (logs)....	11.00 to 15.00
Havre.....	0.10	0.50	0.30	0.27½	0.40	0.75	8.00T	Slow	Peru-Chile.....	12.00 to 14.00
Bordeaux.....	0.10	0.50	0.30	0.27½	0.40	0.75	8.00T	Slow	South Africa.....	17.50 to 19.00
Barcelona.....	0.20 to 0.25	12.00T	0.30	10.00T	—12.00T—	—	10.00T	Fair	Cuba.....	11.00 to 12.50
Lisbon.....	0.20	0.65	0.40	7.00T	—20.00T—	—	7.00T	Fair to Good	United Kingdom.....	80s to 90s
Marseilles....	0.14	0.55	0.50	5.60T	—20.00T—	—	5.00T	Very Slow	United Kingdom (ties)...	70s to 80s
Genoa.....	0.13	0.50	0.40	0.27	0.40	0.80	6.00T	Fair	Baltimore-Boston range.	\$12.00 to 13.00
Naples.....	0.13	0.50	0.40	3.27	0.40	0.80	6.00T	Fair	Baltimore-Boston range. (ties).....	Not quoted
Constantinople	0.23	17.00T	0.75	0.32½	—20.00T—	—	9.00T	Quiet	Buenos Aires.....	14.00
Alexandria....	None	17.00T	0.75	0.32½	—20.00T—	—	9.00T	Fair	Flour and Wheat	
Algiers.....	0.20	0.75	0.75	0.40	—20.00T—	—	7.00T	Very Slow	Oriental Ports (net ton). \$	4.50 to 5.50
Dakar.....		14.50T		12.00T	—20.00T—	—	10.00T	Good	U. K. and Continent (gross ton).....	30s to 32s 6d
Capetown....	12.00T	12.00T		10.00T	—12.00T—	—	9.00T	Good	Mediterranean.....	35s to 37s 6d
Buenos Aires.		18.00 to 20.00T			18.00 to 20.00T†	8.00 to 8.80T		Quiet		
Rio de Janeiro		19.00 to 21.00T		7.00 to 7.70T	19.00 to 21.00T†	6.00 to 6.60T†		Not Good		
Pernambuco..		22.00T		9.00T	—22.00T—†	8.60T†		Fair		
Havana.....	0.22½ to 0.27½*	0.42½*		0.22½*	0.54*	1.08*	0.20*	Fair		
Vera Cruz....	0.25	0.40	0.45	0.25	0.52½	1.05	0.30 to 0.35	Good		
Valparaiso....		1.07		0.70	0.45	0.80	10.00T	Good		
San Francisco.		0.40 to 0.70		0.50 to 1.10		2.50	0.55 to 1.00	Good		
Sydney.....		18.00T	2.50	18.00T	18.00-24.00T	9.00-12.00T		Quiet		
Calcutta.....		16.00T	0.60	12.00T	—16.00T—	10.00T		Fair		

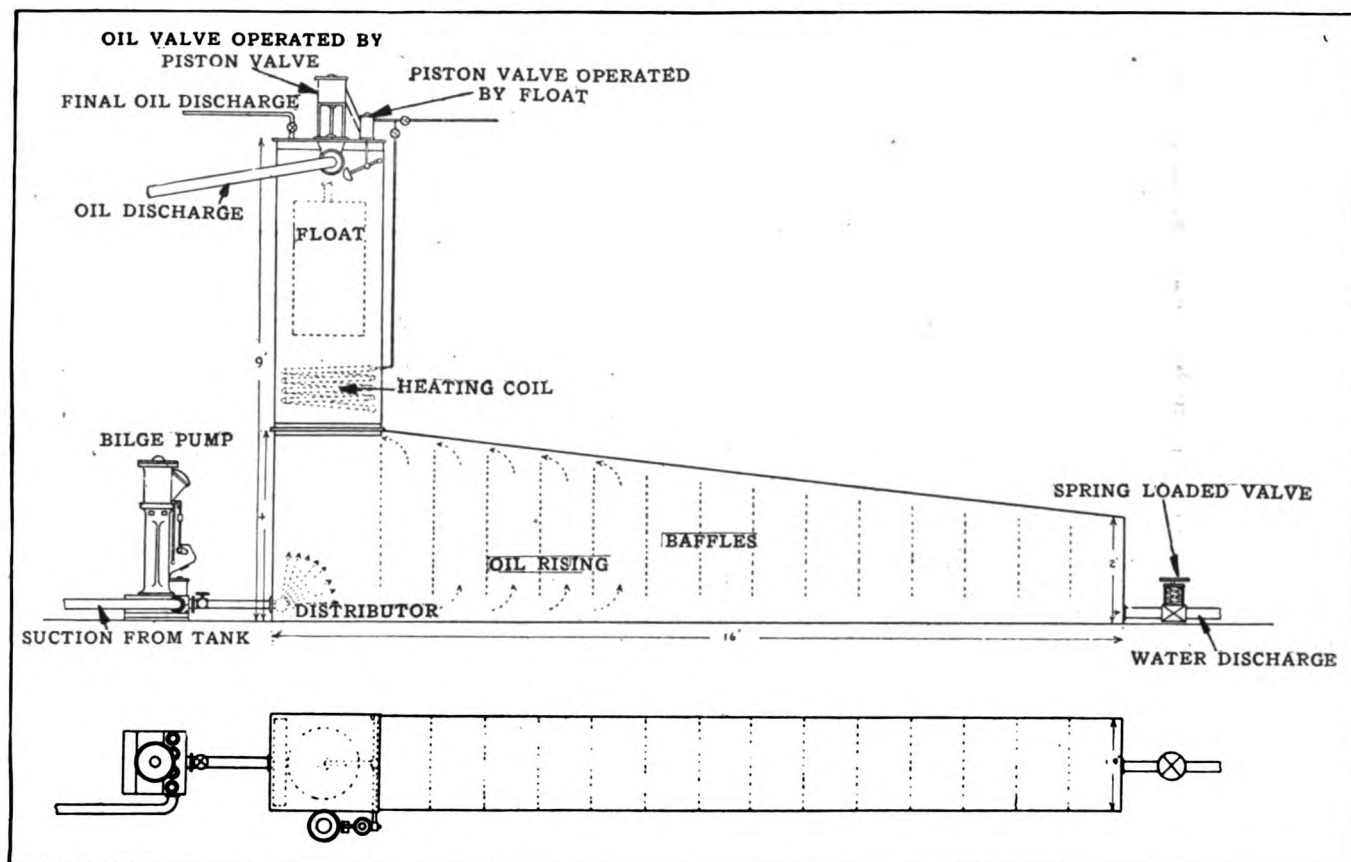
T—Ton. †Per quarter of 480 lbs. †Landed. ††Heavy products limited in length. \*Extra charge for wharfage.

## Principal Rates To and From United Kingdom

Grain, River Plate to United Kingdom.....	26	d	Pig iron, United Kingdom to New York	14	0
Coal, South Wales to Near East.....	11	6	or Philadelphia.....	14	0
Coal, United Kingdom to Buenos Aires....	13	9	Iron ore, Bilbao to Middlesbrough....	6	6
Manganese Ore, Poti to Philadelphia.....	\$4.00		Iron ore, North Africa to Philadelphia	7	0

## Bunker Prices

At New York				At Philadelphia				Other Ports	
Coal alongside per ton	Fuel oil alongside per barrel	Diesel oil alongside per gallon		Coal trim. in bunk. per ton	Fuel oil alongside per barrel	Diesel oil alongside per gallon		Boston coal, per ton	\$7.15
July 11 1923 \$5.50@7.00	\$1.76½	4.40@5.50c		July 9, 1923 \$5.85@6.85	\$1.62 @1.73	4.35@4.60c		Boston, oil, f. a. s., per barrel.....	\$1 47
Oct. 11.....5.25@6.85	1.51½	4.00@4.50c		Oct. 11.....5.60@6.10	1.36½@1.51	4.12@4.36c		Hampton Roads, coal, per ton f.o.b., 4.00@4.75	
Jan. 9, 1924...5.25@6.85	1.41½	4.63@5.42c		Jan. 9, 1924...5.50@6.30	1.41½	3.86c		Cardiff, coal, per ton 16s 6d	
April 8.....4.50@6.50	1.66½	5.51c		April 8.....4.85@5.85	1.955	5.41@5.65c		London, coal per ton 24s 6d	
July 21.....4.50@6.25	1.81½	5.16@5.65c		July 21.....4.85@6.00	1.945	5.40		Antwerp, coal, per ton 23s 6d	
Aug. 21.....4.50@6.05	1.81½	4.91@5.16c		Aug. 21.....4.85@5.80	1.74½@1.81½	4.85@4.90			



SECTION THROUGH OIL SEPARATOR DESIGNED FOR INSTALLATION ABOARD SHIP

## Design Oil Separator for Use on Ship

THE rapidity with which oil is replacing other fuels for ship propulsion results from a study of its advantages in economy and efficiency. But a coincident disadvantage has arisen in dealing with the oil-permeated bilge water. The "oil nuisance" has become so serious that Great Britain found it necessary in 1922 to adopt the oil in navigable waters act, which prohibits ships under heavy penalties from discharging oily water from their bilges and tanks within three miles of the shore. America similarly has made it unlawful to discharge oil from vessels in coastal navigable waters.

Legislative remedies have so far been only partially effective since the oil still floats in masses on the surface of the sea and is washed in shore. Obviously, the true remedy is some device which will enable each ship to deal with its own polluted water, at the same time removing the nuisance, and enabling the oil to be utilized for further service.

The Pirbright Co., Ltd., Bond Court House, Walbrook, London, Eng., has invented an oil separator which it is claimed will separate any two liquids of different density such as fats, oil, grease, tallow, etc., from water. It is not claimed that it will break up emulsions into their constituent parts, but that most emulsions

can be thoroughly separated from water.

The accompanying drawings give a general idea of its design. An important factor is the automatic operation. Working of the separator depends on the horizontal flow of the oil and water mixture in two directions, and the difference in specific gravities. The apparatus consists of a suitable tank with a float chamber situated at one end and securely bolted to the top of the tank. The float in this chamber is so weighted that it will float in water or in the heavier of two liquids, but will have no buoyancy in oil or similar lighter liquids. The float operates a control valve which by means of steam, compressed air, or hydraulic pressure automatically opens and closes the oil discharge valve. The control can be effected electrically and where it is desirable to warm the oil, this can be effected with a steam coil.

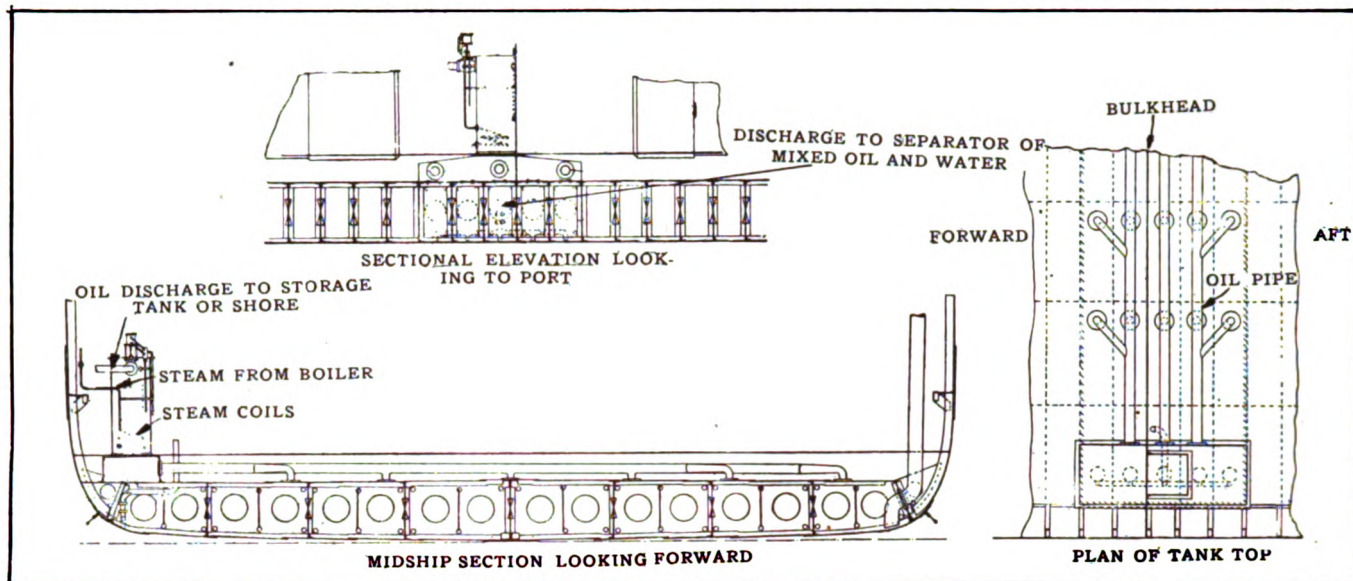
The filling of the apparatus with water raises the float thus closing the oil discharge valve. The control can be let it so arranged that a pressure of two pounds or more is available at the oil discharge valve. Then the oily water is pumped into the lower part of the tank underneath the float chamber, with the result that some of the oil rises directly into the chamber. The remainder being

gradually released from the water during its passage through the tank finds its way between the baffles and along the sloping roof of the tank up to the float chamber.

As the oil accumulates in the float chamber, it gradually displaces the water causing the float to sink and operate the control valve or switch which opens the oil discharge valve. The accumulated oil is forced out by the upward pressure of the water. The rising water then lifts the float which closes the oil discharge valve. This operation is repeated automatically as often as sufficient oil collects in the float chamber.

At the highest point of the float chamber is a hand operated valve by means of which the last few gallons of oil can be finally discharged after the automatic valve is closed if such final operation is necessary. On the cessation of pumping, the outflow of oil from the apparatus ceases, the whole tank remaining full of water ready for the next day's operations.

The oil separator was originally designed for installation in a portion of the cellular double bottom, but the inventors state that it can be installed elsewhere if necessary, such as in obsolete coal bunkers of converted ships. The



VIEW SHOWING HOW SEPARATOR IS INSTALLED

double bottom position, however, is strongly recommended as most suitable, especially from the point of view that this prevents encroachment upon cargo space. The only part of the apparatus which need be above the floor plate level is the float chamber which for most vessels would be about 4 feet 6 inches high by 2 feet 6 inches square. No extra top hamper has to be carried and as the separator is kept full of water, it is regarded as serving the purpose of ballast, thereby assisting in maintaining the stability of the ship.

#### Can Use Oil Again

It is claimed that the oil is recovered in sufficient purity to be used again, thus effecting a considerable saving. Obviously time can be saved if the ship can separate

her own oil and avoid the necessity of pumping the oily mixture into barges or other outside receptacles necessarily involving delay and expense. Obvious advantage also would follow carrying out pumping and separating coincidentally with other operations either at sea or during the stay of the ship in harbor.

The Pirbright Co., it is said, guarantees the discharge of ballast or bilge water free from oil into the sea and the return of the recovered oil to ship's storage tanks, practically free from water, but in no case to contain more than 2 per cent. The company has acquired several self-propelled ex-admiralty steel lighters into which oil separators are being fitted for the purpose of dealing with the oily water from ship's tanks at Southampton and other ports.

## Gyro-Compass School Has Tenth Anniversary

The gyro-compass school of the Sperry Gyroscope Co., Brooklyn, N. Y., has just celebrated its tenth anniversary. Instituted in the summer of 1914, this school has never had an idle day. The first four years of the school were devoted entirely to the instruction of United States and foreign naval personnel, as the output of the company's gyro-compasses was confined to naval use. Later the importance of having trained personnel in the navy on gyro-compasses prompted the government to use the gyro-compass course given by the Sperry school in the federal electrical schools at Hampton Roads. This allowed the school at the Sperry plant to devote the time to the merchant service personnel, as gyro-compasses were then available for merchant ships.

The school has grown to a point where about 75 men and officers per month receive instructions. Due to the fact that some of the personnel only have several days while their ships are in port, the course is so arranged that they can continue the course from time to time, and finally pass an examination and receive a certificate.

This school has also been expanded to include instructions on the high intensity searchlight, the gyro-pilot, and other Sperry navigational equipment. With the growth in use of this equipment, it has been necessary for the Sperry school to open branches in Los Angeles, San Francisco, Seattle, Cleveland and Liverpool. The Sperry school has been in operation in London for many years.

The course includes the theory of the gyroscope and the gyro-compass, assembly and disassembly, care, maintenance and operation, and finally the use of the compass in true north navigation.



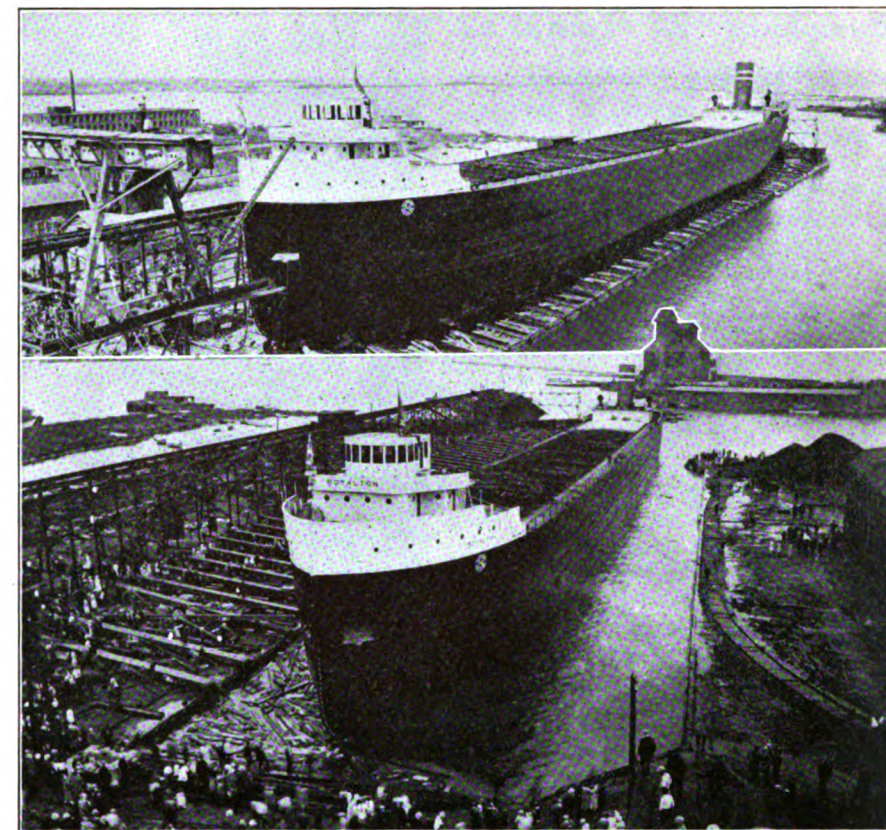
STUDENTS AT GYRO-COMPASS SCHOOL WHICH IN THE LAST TEN YEARS HAS GRADUATED THOUSANDS OF NAVAL AND MERCHANT OFFICERS

## Barber Line Considers Motorship Fleet

Oakley Wood, vice president of the Barber Steamship Line, New York, indicates that his company is studying the chance of adding motorships to its fleet. The company has been selected to operate the consolidated shipping board service to the Far East. According to Mr. Wood, the Barber company "has been in the market for some time for ships suitable for these trades, provided they can be purchased on terms that would permit competition with foreign flag lines. We would like very much to get a fleet of motorships with the necessary speed and economy and efficiency of operation for successful competition.

"It may be possible for us to establish such a fleet under the provisions of the diesel engine bill passed at the last session of congress, but we have no definite statement to make on this point just now. The Barber Line is anxious to do its share in expanding the American merchant marine wherever and whenever possible, and we shall not overlook any opportunity to do this."

Frank C. Osborn, manager of the operating department of the Munson Steamship Lines, died on Aug. 16, following an operation in St. Peters hospital, Brooklyn. He was taken away in his prime as he was but 50 years of age. Mr. Osborn had been connected with the Munson Steamship Line for 30 years and for some time had been manager of the maintenance, personnel and operation of the line. He attended the Connecticut Agricultural college and went



LAUNCH OF CANADIAN FREIGHTER AT COLLINGWOOD YARD  
Bulk freighter ROYALTON, built for the grain, ore and coal trade of the Great Lakes, was launched by the Collingwood Shipbuilding Co. Aug. 9

directly from school into steamship work. His loss to the Munson Line will be keenly felt, as he had shown ability in the management of his department.

The International Mercantile Marine Co. has assigned the steamship POLAND, 8282 tons, to the newly established Red

Star Line service between Antwerp and New Orleans, by way of Corunna, Vigo, Havana and Vera Cruz. The POLAND will ply with the GOTHARD, 7660 tons, which for some months has been engaged in third class traffic between Spanish ports and Havana. Both ships are of the liner type and are well known.

## Mauretania Breaks Westward Transatlantic Record

ON THE voyage ending in New York Aug. 14, the MAURETANIA broke all previous records across the Atlantic from Cherbourg to that port, making the distance in 5 days, 3 hours and 20 minutes. The fastest previous run from Cherbourg to New York was that of the LEVIATHAN in November, 1923, of 5 days, 7 hours and 20 minutes. The MAURETANIA has recently been converted to an oil burner and unless the LEVIATHAN or the MAJESTIC have a reserve on which they have not called, it now looks as if the MAURETANIA will hold the record as the fastest transatlantic liner. Below are the three fastest runs made by the three fastest transatlantic liners:

### Fastest Runs Between New York and Cherbourg

Time			Date of run	Direction	Average	
	days	hrs. min.			Dist. miles	Per hr. Knots
MAURETANIA						
5	3	20	Aug. 1924	Westward	3157	25.60
MAJESTIC						
5	5	21	Sept. 1923	Eastward	3104	24.76
LEVIATHAN						
5	7	20	Nov. 1923	Westward	3078	24.17

On her return trip ending Aug. 25, the Mauretania ran from New York to Cherbourg in 5 days, 1 hour, 49 minutes, covering 3098 miles at an average of 26.25 knots, a new record.



## Completes 25 Years as Shipyard Manager

George Clarke, manager of the Kensington shipyard of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, was the guest of honor at a surprise dinner held recently. When he reached the Philadelphia yacht club, on invitation to attend the birthday party of Elisha Webb Jr., of the Elisha Webb & Son Co., Philadelphia, Mr. Clarke found that actually it was a testimonial to the completion of his 25 years of service with the Cramp company.

Mr. Clarke is now in his eightieth year. In 1872, he was made assistant superintendent of the American line, remaining in that capacity until 1896 when he became superintendent of construction of the Newport News Shipbuilding & Dry Dock Co. In 1899, he took up the position with the Cramp shipyard which he now holds. Mr. Clarke was presented with a ship's bell clock.

The committee in charge of the dinner included Elisha Webb Jr., toastmaster, M. C. Furstenau, A. F. Brown and W. E. Bernard. A number of Cramp company officials, headed by J. Harry Mull, president, attended.

Those at the dinner were: George Clarke, Elisha Webb Jr., Albert F. Brown, J. Harry Mull, Francis L. Cramp, E. C. Ceehr, George Pierce, J. W. Atlee, Howard Fisher, John Morrow,



L. E. ARCHER

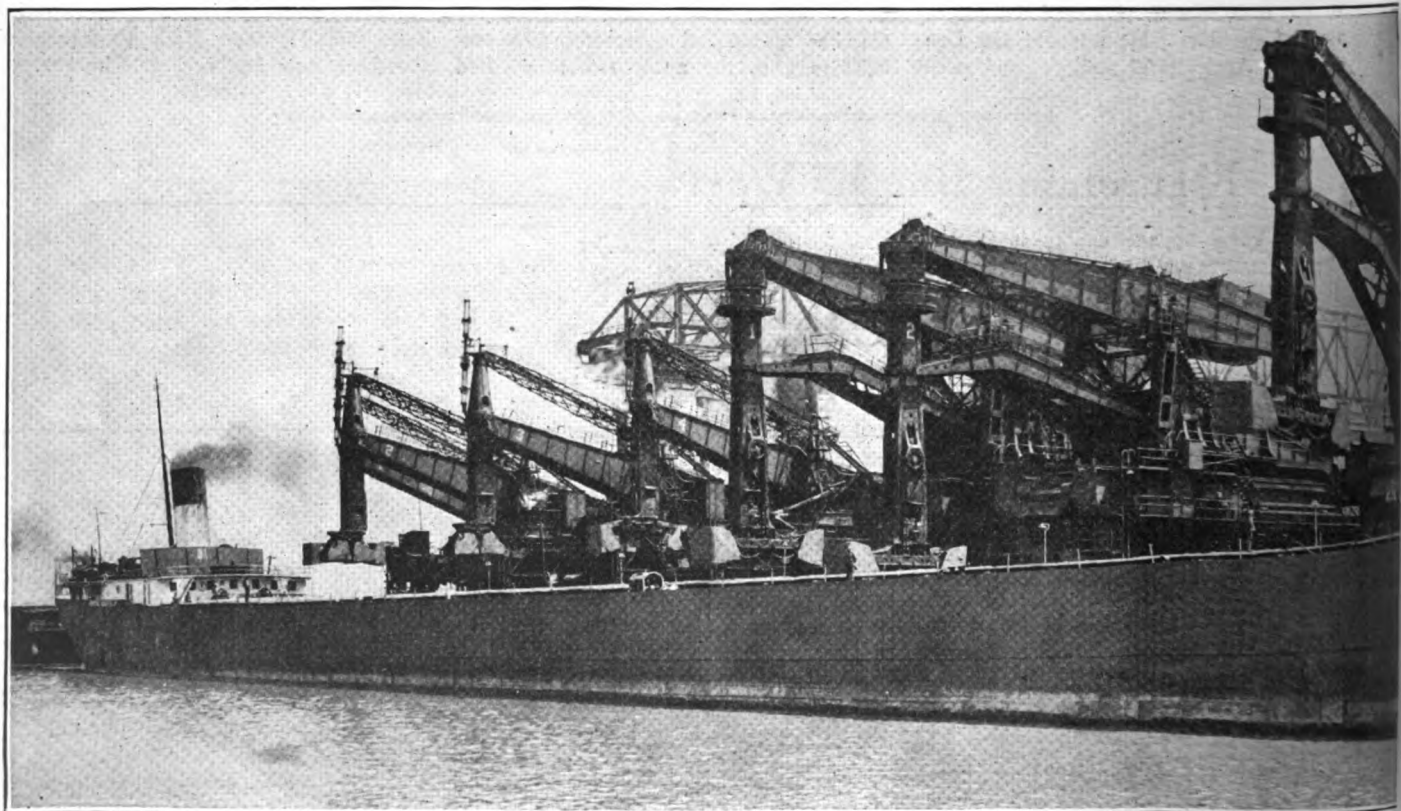
Recently appointed Pacific coast manager at San Francisco of the International Mercantile Marine Co.

Isaac Speigle, Frank Chandler, Thomas Lowe, Charles E. Davis Jr., P. F. Martin, E. L. Frankenfield, John Taylor, George F. Sproule, Charles F. Sherry, M. C. Furstenau, William McKeon, Joseph Gabriel, James S. Jefferson, J. J. McNally, Theodore B. Palmer, Captain R. A. Sargent, J. E. Wilson, O. Narbeth, James Dunlop, L. H. Garrison, George Stewart, James Clarke,

Thomas Arnott, George W. Bradley, Sam Bowker, George Simmons, Samuel Mills, John Boyt, Mr. Workman, R. W. Robinson, Robert Haig, J. K. Graham, R. L. Burke, Bert Thomas, Henry J. Kunzig, William Watters, Fred Kalesse, J. Hampton Webb, James Hughes, Robert Maguire, W. E. Bernard, William Herner, Howard Cornell.

## Modern Unloading Plant Is Enlarged

Two new ore unloading units have been placed in service at the ore dock of the Pittsburgh & Conneaut Dock Co., Conneaut Harbor, O. This dock, it is claimed, now is one of the most modern and completely equipped ore unloading stations in the world, the complement of unloaders now totaling nine as shown by the accompanying illustration. All unloading machines were built by the Wellman-Seaver-Morgan Co., Cleveland. The two units recently installed were built in record time. Contracts were awarded Jan. 1, 1924 and the machines were placed in operation July 1, 1924. The four machines shown at the left in the accompanying illustration were the first of this type to be constructed, the contract having been placed in 1898. These units are of 10 tons capacity each and are operated hydraulically. The remaining five machines are electrically operated, the first of this type having been installed in 1910.



ORE UNLOADING FACILITIES AT THE ORE DOCK OF THE PITTSBURGH & CONNEAUT DOCK CO., CONNEAUT

## Boost Passenger Rates to South America

For the distance covered and the service provided, ocean passenger rates from New York to east coast ports of South America have for some time been abnormally low. This condition was brought about by the inability of the two large lines engaged in this service to join in an agreement on rates, with the result that instead of co-operation, there has existed a futile rate war. It is, therefore of interest to learn that a substantial increase in rates has been mutually agreed upon. The new schedules call for a uniform rate for both the Munson Steamship Lines operating four American flag vessels as managing agents for the shipping board, and the Lamport & Holt Ltd., an English line operating four vessels under the British flag. Even the new rates are proportionately lower than the rates in effect between Europe and South America, but they do mark an important step in placing this service on a self-supporting basis.

The accompanying tables give a summary of the minimum new and old schedule of rates.

From Tables I and II, it is clear that there has been a basic increase of \$50 per passage per person first class for the American line and an increase of \$90 to \$100 per passage per person for the British line, and a flat increase of \$25 for third class.

Table I

### New Rates South American Passenger Service

Went into effect June 19, 1924 for sailings after July 15, 1924

One way rates to or from New York

Line	Ships	Ports	Min. 1st class per person	Min. 2nd class per person	Min. 3rd class per person
PAN AMERICAN LINE (American Flag) Operated by Munson S. S. Lines.	American Legion	Rio de Janeiro	\$250	No second class	\$100
	Pan America	Santos*	\$260	No second class	\$105
	Southern Cross	Montevideo	\$270	No second class	\$120
	Western World	Buenos Aires	\$300	No second class	\$125
Lamport & Holt Ltd. (British Flag)	Voltaire	Rio de Janeiro	\$250	\$170	\$100
		Santos*	\$260	\$175	\$105
		Montevideo	\$270	\$205	\$120
		Buenos Aires	\$300	\$210	\$125
	Vauban Vestris	Rio de Janeiro	\$225	\$155	\$100
		Santos*	\$235	\$160	\$105
		Montevideo	\$260	\$190	\$120
		Buenos Aires	\$270	\$195	\$125

\*Note: Lamport & Holt ships do not touch at Santos, but through tickets are sold, transshipping at Rio de Janeiro on Royal Mail or Pacific Steam Navigation ships.

Table II

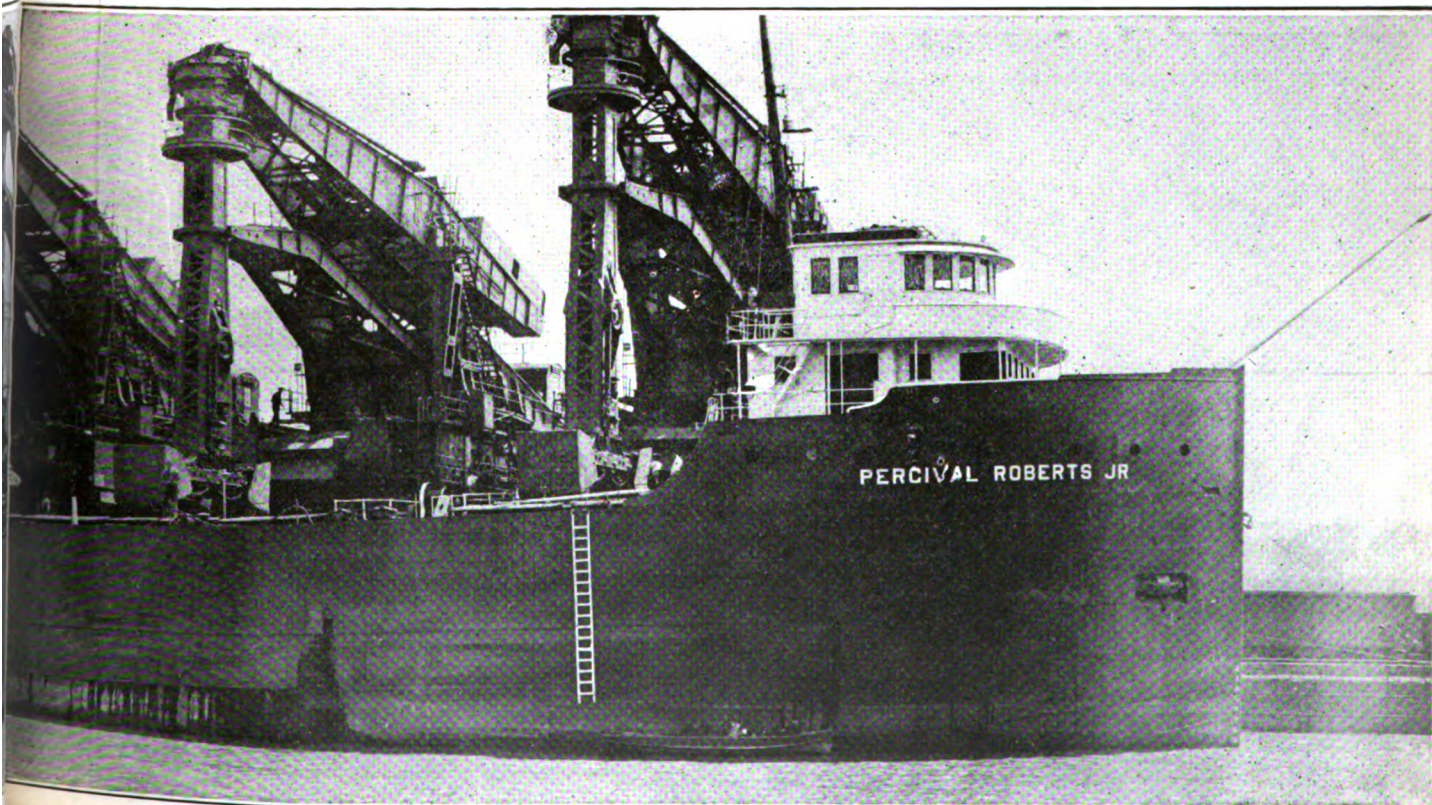
### Old Rates South American Passenger Service

Discontinued June 19, 1924

One way rates to or from New York.

Line	Ships	Ports	Min. 1st class per person	Min. 2nd class per person	Min. 3rd class per person
PAN AMERICAN LINE (Munson S. S. Lines) (American Flag)	American Legion	Rio de Janeiro	\$200	No second class	\$ 75
	Pan America	Santos	\$210	No second class	\$ 80
	Southern Cross	Montevideo	\$240	No second class	\$ 95
	Western World	Buenos Aires	\$250	No second class	\$100
Lamport & Holt Ltd. (British Flag)	Voltaire Vandyke	Rio de Janeiro	\$160	\$125	\$ 75
		Santos*	\$165	\$130	\$ 80
		Montevideo	\$200	\$160	\$ 95
		Buenos Aires	\$200	\$160	\$100

\* Note: By transshipping at Rio de Janeiro.



HARBOR, O. TWO ORE UNLOADERS RECENTLY WERE INSTALLED MAKING A BATTERY OF NINE MACHINES

# Practical Ideas for the Engineer

## Operating Costs Can Be Lowered by Keeping Watch on Heat Value of Fuel Oil Used

**I**N MAKING an evaporative test of any steam plant, it is essential to know the heat value of the fuel used but whether such tests are made or not, knowing the heat value of the fuel used is of the greatest importance in the control of the fuel costs of operation. The annual report of the Compagnie Generale Transatlantique, for 1922, contains this significant statement "the operation of a fleet such as ours represents a very considerable expenditure for fuel and lubricants. The great efforts which were made in preceding years to reduce these expenses as much as possible were continued with the result that considerable economies were effected."

Fuel represents the largest single item in the operation of a ship and is easily double that for wages. Investigation of a particular class of transatlantic vessels showed that the fuel costs represented from 23 per cent to 30 per cent of the total costs of operation. Fuel costs, therefore, are of the utmost importance in considering ways and means for reducing costs of operation.

Final fuel costs depend on two broad factors; 1.—the quality of the fuel or

its heat value, 2.—the efficiency of the apparatus and method of firing in transforming the fuel into useful heat units, and after this, the most economical use of this heat in the production of power. The latter of these factors may be favorably controlled by careful, intelligent operation, but the amount of loss can not be definitely known unless an evaporative test as suggested above, is conducted.

### Can Find Fuel Value

No difficulty of any consequence is met in accurately establishing the first of these factors, that is, the heat value of the fuel. Stationary plants using 2000 tons and more per year have found the determination of the heat value of their fuel profitable. Since a 3300 deadweight ton ship at sea only one-half of the year will consume more than 4000 tons, every steamship line no matter how large or small, will find that determination of the heat value of the fuel used on its ships is profitable. For this reason, it seems worth while to present in detail an accepted method for fuel testing.

It is impossible to determine the heat value of fuel by appearance or the

locality from which it comes, except in the most general way. The final heat value will be determined by the results obtained when actually used. Good results depend on two conditions; 1.—the quality and nature of the fuel must be suited for the work intended, 2.—The method of firing and using must be correct. A laboratory test is necessary to determine the first condition. The second condition depends on the first in so far as the results of the test will help in obtaining a fuel with proper constituents. The test also will lead to modification of methods of use according to practical experience, particularly to suit the quality and properties of the fuel as determined by such test.

Ideal conditions for any steamship company in the purchase of bunkers, either coal or oil, would be definitely to establish specifications found to be most suitable for use, and to enter into contracts for fuel on this basis at the best price obtainable. The price would have to show a saving in total fuel costs for the term of the contract over that which would hold if cheaper or higher priced fuel with lower or higher specifications

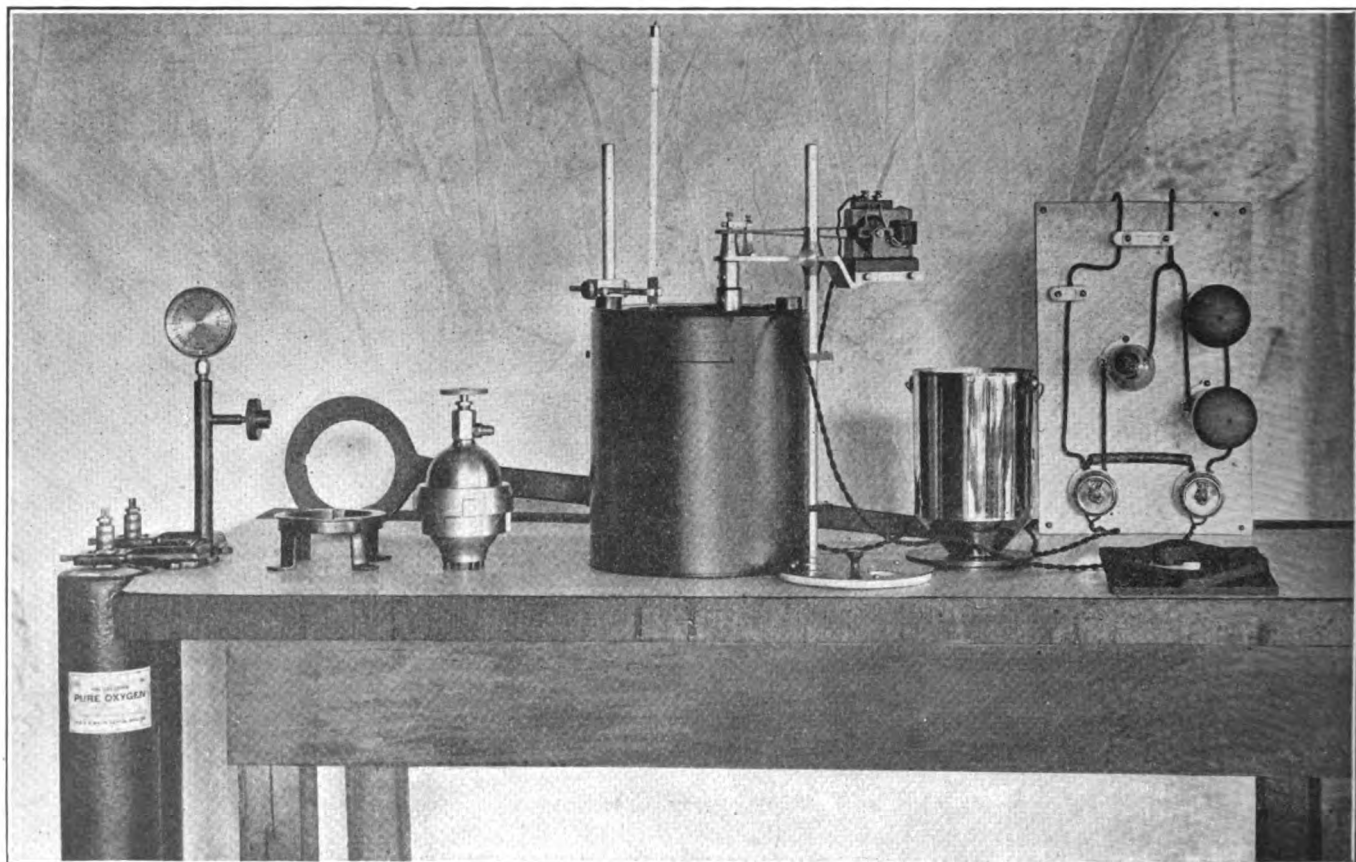


FIG. 1—COMPONENT PARTS OF FUEL CALORIMETER

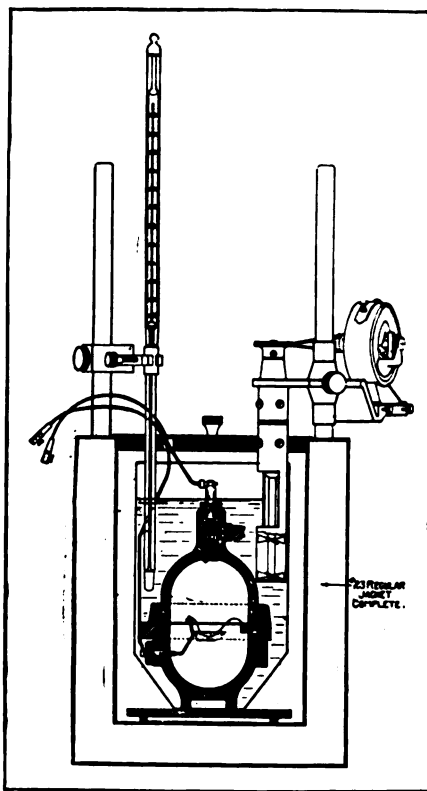


FIG. 2—SECTION OF FUEL CALORIMETER SHOWING BOMB

was used. What is really wanted with all expenses of handling and firing and correct methods of use taken into account is the fuel which will give the least cost per pound of steam. Many other factors enter into this cost besides the quality and cost of the fuel. But the quality and cost of the fuel are fundamental and the quality should not be taken for granted.

Allowing that it is not practicable to buy bunkers for ships on strict specifications, the fact still remains that knowing the quality of the fuel purchased even after it has been put on board is of vital importance to the company in checking the quality received for the price paid. A consistent pursuance of this policy would insure the best obtainable quality. As it stands, without the laboratory test of the fuel, no definite criticism is possible except a general one that the fuel is "very good" "good" "poor" or "very poor" as entered in the engineer's log. Determining the necessary frequency of fuel tests would give adequate information for proper control of the quality received.

The accompanying illustration, Fig. 1, shows the component parts of a fuel calorimeter, while Fig. 2 shows a section through the calorimeter and the bomb or receptacle in which the sample of the fuel is burned. These illustrations were furnished through the courtesy of Charles J. Emerson, president of the Emerson Apparatus Co., 171 Tremont street, Melrose, Mass., the designer and

manufacturer of this apparatus. The essential elements of operation of this so-called "bomb calorimeter" are the same as the original Berthelot type of instrument. Improvements in design have been made, however, which greatly increase its durability and facility of operation. It is designed to be distinctly a practical, commercial apparatus for the determination of the heat value as a measure of quality in the sale and purchase of coal, coke, fuel oil, gasoline, etc. This apparatus is not new and is widely used and well known by all consumers of coal who have adopted the British thermal unit content as a standard of quality.

#### Description of Bomb Calorimeter

The apparatus consists essentially of a strong steel receptacle (called a bomb) into which the sample of the combustible is placed, and within which it is completely burned. Before being placed in the bomb the sample is first pulverized to a finely divided condition. At the proper time, the sample within the bomb, in the presence of oxygen under high pressure to insure complete combustion, is fired by passing an electric current through a fuse wire dipped into it. During combustion, the bomb is completely immersed in a known amount of water, and the rise in temperature of the water is accurately measured with a standard thermometer. The product of this rise in temperature and the known weight of water (plus the water equivalent

of the bomb and other immersed metal parts) gives directly the heat units given off by the burning of the sample, the weight of which is known. From this data, the British thermal units per pound can be determined. This is the commercial value desired.

#### Importance of Sampling

In determining the heat value of fuel, care must be exercised at each step to secure accuracy. Of these steps, the initial one of taking the sample is of utmost importance to the end that a truly representative sample is obtained. As a specific illustration for coal, a large original sample should be taken. This would be taking about one ton out of a 500-ton lot under investigation and in proportion for greater or less amounts. In this way, a fair average of the whole lot is obtained provided the selection is carefully made.

For steamships, the most convenient time and place for obtaining a sample would be either when loading the bunker coal by taking shovelfuls at intervals from the bucket or chute or later during the voyage by instructing the firemen on watch to set aside a shovelful during each stoke period. The larger as well as the smaller pieces should be included in the original sample by breaking fragments from such pieces. Impurities of the coal should be included in proper proportion.

As the sample is reduced in size, it is crushed so that the maximum size of any piece shall be no larger than a cer-

### Sample Run for Determining Heat Value of Coal

Sample No. 128 (air dried.)

Run No. 2.

Thermometer used, No. 2295.

Weight of tube and coal = 7.9379

Weight of tube and coal = 7.0713

Room Temp. = 22 deg. C.

Weight of fuel, grams 0.8666

Weight of water, grams 1900

#### READINGS OF THERMOMETER

Time	Temp.	Time	Temp.	Time	Temp.
0	20.348	30	21.000	30	23.194
1	20.352	6	22.600	10	23.194
2	20.358	30	22.900	11	23.182
3	20.362	7	23.100	12	23.174
4	20.368	30	23.150	13	23.166
5	20.376 Firing Temp.	8	23.194	14	23.158
		30	23.196 Max. Temp.	15	23.150
		9	23.196		

Temperature at firing =  $20.376 + \begin{matrix} \text{(Calibration)} \\ \text{Correction} \end{matrix} \begin{matrix} (-0.011) \\ (+0.002) \end{matrix} = 20.365$

Temperature at max. =  $23.196 + (+0.002) = 23.198$

Rise in temperature corrected for errors in thermometer = 2.833

Rate of change of temperature before firing =  $0.0056 = R_1$

Rate of change of temperature after maximum temperature =  $0.0088 = R_2$

Total cooling correction =  $\frac{(-0.0056)}{2} \times (1) + \frac{(+0.0088)}{2} \times (2.5) = 0.008$  (additive.)

Total corrected rise in temperature = 2.841

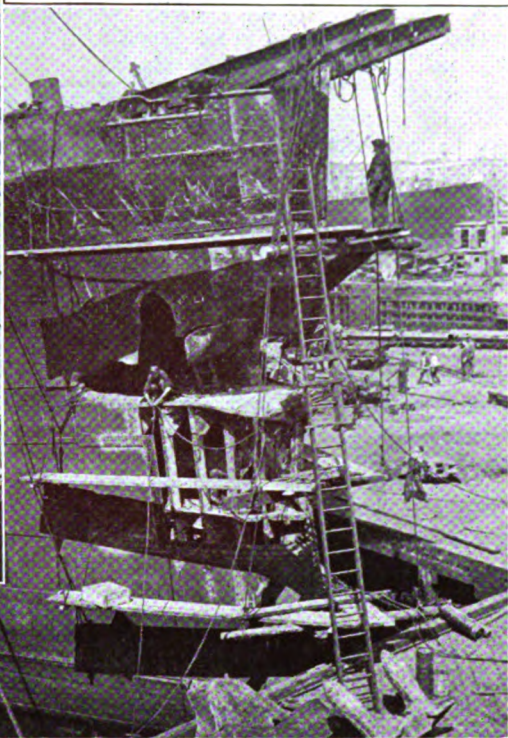
Rise per gram of sample = 3.278.

The water equivalent of bomb, calorimeter can, stirrer, etc. = 490

Gram calories per gram of coal =  $(1900 + 490) \times 3.278 = 7834$ .

British thermal units per pound of coal =  $7834 \times 1.8 = 14,100$

Tanker Swiftarrow (below) and passenger liner Boston (left) collided in a fog on Long Island sound a few weeks ago. These views of the damaged vessels were taken at New York plants of the Todd Shipyards Corp.



## Repairs to Liner Boston Cost \$129,000

Contract to repair the Eastern Steamship Co.'s liner BOSTON, damaged in a collision with the tanker SWIFTARROW, was taken by the Tietjen & Lang plant of the Todd Shipyards Corp., New York. The work was to be completed in 38 days at a cost of \$129,000. Other prices submitted by New York yards were: Fletcher & Co., \$139,000, 40 days; Staten Island Shipbuilding Co., \$140,000, 48 days; Morse Dry Docks, \$144,800, 42 days.

## Low Water Records Set on Great Lakes

The United States lake survey reports the monthly mean stages of the Great Lakes for the month of July, 1924, as follows:

Lakes	Feet above mean sea level	
	June	July
Superior .....	601.28	601.39
Michigan-Huron .....	579.38	579.52
St. Clair .....	574.73	574.94
Erie .....	572.36	572.45
Ontario .....	246.27	246.21

Lake Superior is 0.11 foot higher than last month, 0.48 foot lower than a year ago, 1.17 feet below the average stage of July of the last 10 years, 2.43 feet below the high stage of July, 1876, and 0.09 foot below the low stage of July, 1879.

Lakes Michigan-Huron are 0.14 foot higher than last month, 0.36 foot lower than a year ago, 1.39 feet below the average stage of July of the last 10 years, 4.06 feet below the high stage of July, 1876, and 0.36 foot below the low stage of July, 1923.

Lake Erie is 0.09 foot higher than last month, 0.46 foot higher than a year ago, 0.37 foot below the average stage of July of the last 10 years, 1.96 feet below the high stage of July, 1876 and 0.99 foot above the low stage of July, 1895.

Lake Ontario is 0.06 foot lower than last month, 0.41 foot higher than a year ago, 0.45 foot below the average stage of July of the last 10 years, 2.51 feet below the high stage of July, 1862 and 1.62 feet above the low stage of July, 1895.

A tablet to Capt. John Ericsson, designer and superintendent of construction of the famous iron clad Monitor, of the Civil war, was unveiled July 31 at 95 Franklin street, New York, the site of Captain Ericsson's old residence. The ceremony was held under the auspices of the National Museum of Engineering and Industry and marked the 121st anniversary of Captain Ericsson's birth.

tain specified size for any given weight of sample. The American Society for Testing Materials has stipulated the maximum size for the given weight of sample, from 3/16 inch diameter for 30 pounds to 1 inch in diameter for 1000 pounds.

A good method of reducing the weight of the sample is by quartering, lines drawn through the sample at right angles dividing it into four quarters and two opposite quarters being then taken out and the remainder retained. After again thoroughly mixing, the part retained is crushed and quartered. This process is continued and the average quality is maintained if the mixing is reasonably thorough. After the sample has been reduced to 100 pounds or less, it may be mixed and reduced on a piece of cloth to a few pounds in weight. This laboratory sample is run through a grinder, mixed and quartered on oil cloth and glazed paper until the final sample, weighing 40 grams is obtained. This final sample is finely pulverized until it will pass through an 80-mesh sieve. This sample is then placed in a sealed bottle ready for the test. Under no circumstances should the sample be left exposed to the air on account of the moisture which may be lost.

For testing fuel oil, calorimeter outfits with bombs having acid proof linings are preferable. Samples of fuel oil for testing should be kept in a small weigh-

ing bottle with dropper inserted through the stopper. The dropper is used for transferring the fuel from the bottle to the bomb. After a proper amount of fuel oil has been transferred from the bottle to the fuel pan of the bomb, the stopper is replaced in the weighing bottle. The weight of the bottle with the stopper is taken before and after the test oil is removed. The difference in the two weighings gives the net weight of the liquid fuel in the bomb.

With heavy oils, the oil can be dropped directly on to a small quantity of ignited asbestos in the pan. The upper half of the bomb should be placed in position immediately after the oil is dropped into the fuel pan to prevent any vaporization of sample.

The accompanying records show a sample run for determining the British thermal units per pound of coal.

A person of average skill and intelligence can after one or two days' instruction and a number of trial runs become thoroughly versed in the operation of the calorimeter for all practical purposes.

The shipping board has allotted \$400,000 for improving the Charleston, S. C., port terminals. Funds for this work are to be allocated from operating funds set aside for this purpose during the fiscal year of 1924.

# Big Motorship for Henry Ford-V

BY H. M. VARIAN,  
*Chief Engineer, Great Lakes Engineering Works*



Motorship BENSON FORD approaching coal dock at Toledo for her first cargo

**T**HE main engine of the BENSON FORD is a 4-cylinder, opposed piston, 2-cycle solid injection Sun-Doxford oil engine built by Sun Shipbuilding & Dry Dock Co., Chester, Pa. It has a 23½-inch bore by 45½-inch stroke, normal revolutions per minute of 85, horsepower 3000 brake and Kingsbury thrust bearing. The propeller is 16 feet 6 inches in diameter by 15 foot pitch, giving the vessel a sea speed of 13 statute miles per hour loaded. The main engine fuel pump is driven from the crankshaft through gears.

## Auxiliaries Necessary to Operation of Main Engine

The scavenging blowers are in duplicate, with a capacity of 12,000 cubic feet per minute at 2 pounds pressure each. The blower runs at 3600 revolutions per minute and the motor at 1100 revolutions per minute, each driven by 180 horsepower motors. The blowers are placed aft of the engines on the working deck. They draw air

through 24-inch pipes from a pent house on the boat deck and deliver it to the scavenging belt on the main engine.

The cooling system for the main engine includes a jacket water cooling pump, a jacket water cooler, two jacket water circulating pumps and a guide and exhaust cooling pump. The jacket water cooling pump is of the centrifugal type, 1100 gallons per minute, 1100 revolutions per minute, 25-foot head, driven by a 15 horsepower motor. This pump is manufactured by the Union Steam Pump Co., Battle Creek, Mich., the motor by the Crocker-Wheeler Co., Ampere, N. J. This pump is used for circulating sea water through the jacket water cooler. This cooler was supplied by the Griscom-Russell Co., New York, and is capable of reducing the temperature of the jacket water from 160 degrees to 120 degrees Fahr.

The jacket water circulating pumps include one centrifugal pump, 550 gallons per minute, 1700 revolutions per

minute, 80-foot head driven by a 20 horsepower motor and one vertical duplex, 8½ x 10 inches, fully enclosed power pump, connected through a speed reducer to a 15 horsepower motor. This pump operates at 60 revolutions per minute and the motor at 1100 revolutions per minute. Both pumps are manufactured by the Union Steam Pump Co. with Crocker-Wheeler type motors. Only one of these pumps is required for operation, the other being a spare. They draw from a 5-ton tank located under the engine room floor and discharge through the jacket water cooler, a duplex, cloth strainer and then to the main engine cylinder jackets and valves. The water drains by gravity from the engine back into the 5-ton tank, completing its circuit. Distilled water is used for this service.

The guide and exhaust cooling pump is a centrifugal type, 250 gallons per minute, 1700 revolutions per minute, driven by a 7½ horsepower motor. The pump draws from the sea and is used for circulating water to the cross-

## General Particulars of Great Lakes Motorship Benson Ford

Builder—Great Lakes Engineering Works, Detroit.

Length overall, feet, inches, 612.

Length between perpendiculars, feet, inches, 586.

Beam, molded, feet, inches, 62.

Depth molded, feet, inches, 32.

Load draft, feet, inches, 20.

Tonnage, net, 6393.

Tonnage, gross, 8626.

Deadweight, long tons, 12,000.

Service speed, loaded, statute miles, 13.

3 cargo holds.

18 hatches, 12 x 40 feet, with sliding plate covers.

Quarters for 33 officers and crew.

3 staterooms, sitting room and private dining room for owner.

2 steel masts.

### Equipment

2—8000 pound bower anchors with 180 fathoms of 2¼-inch cast steel chain

cable.

1—4000 pound kedge anchor.

1—Hyde type spur geared windlass, motor driven.

6—Lidgerwood type electric mooring machines, each fitted with 70 fathoms of 1⅝-inch wire rope, driven by electric motors and with automatic tension device.

2—Lidgerwood type electric winches for handling hatch covers.

1—American Engineering Co. electro-hydraulic steerer connected directly to rudder stock and controlled by Benson electric telemotor from pilot house. Electric telemotor, motors and pumps are all in duplicate, arranged so that wheelsman can change over from one system to the other by throwing a single switch in the pilot house.

2—Brunswick - Kroeschell, motor driven, 2-ton ice machines, one forward and one aft. Forward machine has tank for making ice. Scuttle butts

for ice water forward and aft.

2—Electric water heaters forward to supply hot water to galley and lavatories.

1—Steam water heater aft for same purpose.

Sperry gyro-compass with five repeaters; two in pilot house, one on deck, each side of pilot house and one in observation room.

Kolster radio direction finder fitted over Sperry compass in pilot house.

Forbes recording log and speed indicator.

Electric telegraph from pilot house to engine room.

Electric mate's telegraph from pilot house to deck aft.

Automatic electric striking device for ship's bell.

Haynes sounding machine.

Maher draft gage.

Sperry revolution counter and engine indicator.

head guides and to the water jackets around the main exhaust pipe.

Lubricating oil circulating pumps are installed in duplicate. They are of the Viking rotary type, direct-connected to 600 revolutions per minute motors, and have a capacity of 150 gallons per minute at 40 pounds pressure. The oil cooler is of the Griscom-Russell type. Three 520-gallon settling tanks are fitted with steam coils and temperature regulators. One 250 gallons per minute centrifugal pump is used for supplying cooling water to the oil cooler. Two Sharples type oil purifiers are installed. They are motor driven and are arranged for continuous or batch purification. Oil is drawn from the base of the engine through a duplex suction strainer by the rotary pump and discharged through the cooler to settling tanks; from there through a duplex discharge strainer to the engine lubricating header. About 20 pounds pressure is maintained on the header.

#### Main Engine Fuel System

Two hundred tons of oil are carried in the double bottom under the engine room and a 100-ton bunker is located at the forward engine room bulkhead above the main deck. This bunker is always kept full in case of damage to the double bottom. Two 12-ton daily service tanks, fitted with heating coils and temperature and supply gage regulators are located on the working deck.

A transfer pump of the rotary type, 150 gallons per minute, 600 revolutions per minute, driven by an 8 horsepower motor, draws through the suction strainer and double type manifold and discharges through a strainer to the upper bunker and service tanks. The oil flows from the service tanks through a duplex fine mesh strainer, then a cloth strainer to a fuel meter accurate to three-tenths of 1 per cent. From there, the oil passes through another fine mesh strainer to the main or auxiliary fuel pump at the engine. The main fuel pump is direct-driven from the engine and the auxiliary is motor driven. Oil is discharged to the fuel valves at pressures varying from 6000 to 10,000 pounds per square inch.

Equipment for the starting air system includes two 42-inch diameter air tanks for a pressure of 700 pounds per square inch; one 30-inch diameter air tank for a pressure of 700 pounds per square inch; one Worthington 3-stage, vertical, 700 pounds pressure, air compressor direct-connected to a 75 horsepower, 325 revolutions per minute motor, capacity 150 cubic feet per minute and one Worthington 2-stage, vertical, 700 pounds pressure, 30 cubic foot compressor, direct-connected to a

motor of 30-horsepower capacity.

Two main generators are of 300 kilowatts each, 240-volt, Crocker-Wheeler type, driven at 275 revolutions per minute by 6-cylinder 450 brake horsepower, 2-cycle, solid injection, Worthington diesel engines. Other equipment includes a generator engine cooling pump, Union type and a centrifugal pump 250 gallons per minute, 1700 revolutions per minute, driven by a  $7\frac{1}{2}$  horsepower motor. Scavenging air is ducted to these engines from the pent houses on deck. The fuel for these engines is metered.

One auxiliary generator is installed, rated at 17 kilowatt and driven by a Hall-Scott, 4-cylinder gasoline engine. This unit is for use during spring and fall "laying-up" and fitting out periods.

#### Switchboard and Electrical Equipment

The main switchboard, consisting of the generator panels, instrument panels and circuit breaker distributing panels is located on a balcony on the forward side of the engine room and is of the dead front type. The instruments and operating levers controlling the various switchboard equipment, are mounted on slate panels with the circuit breakers, switches and all current carrying devices mounted on sub-panels behind the operating panel. From this board, the current is distributed to the various sub boards and panels with navy standard leaded and armored cables.

All of the auxiliary equipment on the vessel is motor driven and electrically controlled. There are in all approximately 55 electric motors on the vessel, ranging in size from the smallest, which is  $\frac{1}{2}$  horsepower to the largest which is 180 horsepower. All of these motors are remotely controlled with push button conveniently located and which, in turn, will operate the automatic motor starting devices.

All of the deck auxiliaries on the vessel such as anchor windlass, mooring winches, etc., are electrically driven. The steering gears for the vessel are of the hydro-electric type and are installed in duplicate, each steering gear controlled by electric telemotors.

In addition to the straight line telephones connecting the navigating bridge and the engine room which are required by law, a complete system of loud speaking, intercommunicating telephones of the navy type is installed which will connect all of the various parts of the vessel including the galleys, passengers' quarters, and captain's quarters. The engine order signals are transmitted from the navigating bridge to the engine room by the use of electrically operated ship telegraphs. These will also be used

for transmitting orders from the navigating bridge to the mate's station at the after end of the vessel, to transmit necessary orders in connection with the docking of the vessel. In addition to the engine order telegraphs, an auxiliary electrical engine signal system is used which will be operative from various stations on the navigating bridge and in the wheel house.

The main whistles, which are mounted on the smokestack, are in duplicate and are electrically operated from the wheel house and various places on the navigating bridge. The whistle system also includes an automatic fog signal feature which will enable the fog signals to be blown at stated intervals automatically. In connection with the whistle system an illuminated letter "F" is installed on the foremast of the vessel. This will flash in unison with the operation of the main whistles.

#### Lighting Is Complete

The cargo holds of the vessel are illuminated by flood lights mounted at well protected positions on the bulkheads and the general illumination of the vessel throughout is accomplished by the use of the most modern methods of direct and indirect lighting.

Particular attention has been paid to the selection of the lighting fixtures throughout the owner's and guest's quarters, all of which have been selected with the object in view of having them harmonize with the trim and furnishings of the various rooms. There will be a complete system of alarm bells installed, whereby an automatic alarm may be sounded throughout all of the various living quarters and sleeping rooms on the vessel in case of emergency or danger. All the heating of the quarters is electrical, using Electro-vapor type radiators.

The service pumps include a fire pump, 3-stage, centrifugal, 250 gallons per minute, 100 pounds pressure, 1700 revolutions per minute, with 25 horsepower motor; a mate's or deck pump, 4-stage centrifugal, 150 gallons per minute, 100 pounds pressure, with 20 horsepower motor, a self-priming bilge pump, 200 gallons per minute with  $7\frac{1}{2}$  horsepower motor.

One donkey boiler, 125 pounds pressure, oil fired, 685 square feet of heating surface, is provided with this vessel. Simplex type oil burning equipment is used with a range of 3 to 60 gallons per hour, automatically regulated. The boiler furnishes steam for blowing the whistle, for tank heating coils and for engine room heating. It also supplies steam to two small steam pumps used when laying up to supply sanitary water and to pump bilges.

Typhon type steam horns are used as whistles.

Equipment in the ballast system includes two main centrifugal pumps, 7000 gallons per minute each, direct-connected to 75 horsepower motors; two auxiliary centrifugal pumps, 2500 gallons per minute each, direct-con-

ship side valve on the lower discharge the vent pipe gives sufficient head for the side tanks to be filled without danger of creating a pressure on the tanks.

The auxiliary ballast pumps are for drying out the tanks. They are kept continuously primed during operation

minute and discharges it through sand and gravel filters to a chlorimeter, where it is treated automatically with chlorine. From there it flows to a 2000-gallon treated water storage tank. A pressure controlled pump draws the treated water from this tank and delivers it to the quarters as needed.

## List of Principal Equipment Installed on Motorship Benson Ford

### Scavenging

- 2—Scavenging blowers—centrifugal.

### Air Starting

- 1—150 cubic foot air compressor.  
1—30 cubic foot air compressor.  
3—Air tanks.

### Cooling

- 1—Jacket water tank, 5 ton capacity.  
1—Sea circulating pump to cooler.  
1—Water cooler.  
2—Jacket water circulating pumps, 1 centrifugal, 1 power.  
2—Duplex strainers.

### Lubricating

- 1—Sea circulating to cooler.  
1—Oil cooler.  
2—Oil circulating pumps—rotary.  
3—Settling tanks.  
2—Duplex strainers.  
2—Oil centrifuges.

### Fuel

- 1—Direct and 1 motor driven fuel pump.  
1—Oil transfer pump and manifold.  
5—Duplex strainers in system.  
1—Liquid meter.

### Muffler

- 1—54 inch x 16 foot muffler in stack.

### Crane

- 1—Shepard electric crane for over-haul of engine.

### Generating Engine

- 2—Worthington 450 brake horsepower, 300 kilowatt generating sets.  
1—Cooling pump—centrifugal.  
2—Oil coolers.  
4—Mufflers in stack.  
1—Hall-Scott, 17 kilowatt gasoline

generating set.

- 1—Dead front switchboard, 7 feet high, 18 feet long.

- 4—Engine room control panels distributed through engine room.

### Service Pumps

- 1—Fire pump.  
1—Mate's pump.  
1—Bilge pump.  
1—Oil sump pump.  
All these are electrically driven.

### Steam Equipment

- 1—Donkey boiler.  
1—Fuel pump.  
1—Small simplex sanitary pump.  
1—Small simplex bilge pump.  
1—Injector.  
2—Typhon whistles.  
Steam radiators in engine room only.

- 1—Steam water heater for deck wash fire extinguisher service.

### Ballast Pumps

- 2—7000 gallon centrifugal.  
2—2500 gallon centrifugal.  
2—350 cubic foot centrifugal air primer pumps.  
1—24 valve distributing manifold.  
All these pumps are electrically driven.

### Sanitary System—Water

- 2—10,000 gallon storage tanks.  
1—2000 gallon treated water storage tank.  
1—250 gallon pump.  
1—50 gallon pump.  
1—150 gallon pump.  
2—Drinking water circulating pumps.

These pumps are electrically driven.

### Sewage System

- 2—Sewage discharge pumps and tanks.

### Deck Equipment

- 6—Constant tension mooring winches, electric.  
1—Electric driven windlass.  
1—Hydroelectric steering gear in duplicate.  
2—Electric hatch winches.  
1—Electric boat winch.  
2—Motor driven Brunswick-Kroschell ice machines.

### Instruments

- 1—Sperry revolution counter, electric.  
1—Maher draft gage installation.  
1—Forbes indicating ship's log in pilot house.  
1—Haynes continuous indicating sounding machine.  
1—Complete set gyro-compass installation.  
1—Kolster radio compass.  
Electric order transmitter telegraphs.  
Navy type intercommunicating telephones.  
1—Rudder indicator.  
Radio equipment.  
Electric whistle pulls.

### Miscellaneous Equipment

- Electric ranges in both galleys.  
Electro-vapor radiators for heating all quarters.  
Laundry equipment.  
Electric elevator for small freight forward.

nected to 30 horsepower motors; two auxiliary ballast priming pumps driven by 20 horsepower motors. The combined pumping capacity is 19,000 gallons per minute.

Main ballast pumps are used for emptying or filling the bulk of the water capacity of the ballast tanks and are connected to a 24 valve, double type manifold. They discharge overboard just above the light water line but have an air vent to a point above the side tanks. By closing the

by the priming pumps which are capable of discharging 350 cubic feet of air per minute and can maintain 10 inches of vacuum.

### Sanitary System

All water used in the sanitary and drinking system of this ship is purified and filtered. Water is pumped by a 250 gallon per minute pump from the sea to two 10,000 gallon storage tanks. A float controlled pump draws it from these tanks at 50 gallons per

This equipment is located forward and is electrically driven.

The sewage drains to two sump tanks, one at each end of the ship and is discharged overboard by pumps.

LOUIS A. STOPP, for many years connected with the Warren Line, Furness, Withy & Co., and more recently with the North Atlantic & Western Steamship Co., all of Boston, has moved to Woodhaven, N. Y., and will enter business in New York City.

# Marine Business Statistics Condensed

## Record of Traffic at Principal American Ports for Past Year

### New York

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	491	1,937,802	525	2,081,663
June	465	1,882,471	495	2,014,598
May	466	1,811,769	520	2,046,833
April	469	1,814,848	504	1,958,579
March	418	1,517,503	459	1,694,905
February	378	1,467,340	445	1,738,675
January	370	1,513,056	434	1,749,172
December, 1923	383	1,507,914	445	1,658,423
November	418	1,768,503	461	1,976,338
October	462	1,868,446	489	1,993,758
September	428	1,818,981	477	1,978,023
August	468	1,855,045	520	2,039,732
July	462	1,799,886	490	1,962,302

### Baltimore

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	106	318,585	106	318,182
June	117	339,212	104	298,765
May	122	369,797	126	378,501
April	112	329,900	106	510,159
March	98	297,869	110	331,665
February	98	310,158	107	335,108
January	85	270,169	99	315,804
December, 1923	117	365,142	110	354,229
November	90	280,617	91	279,278
October	96	285,871	95	297,566
September	94	292,315	99	297,965
August	100	303,073	92	262,306
July	130	390,465	137	395,206

### New Orleans

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	241	650,671	250	687,005
June	240	622,326	223	588,554
May	260	703,950	264	696,397
April	249	646,315	262	653,740
March	225	542,040	222	538,642
February	217	604,411	227	610,455
January	217	595,087	220	588,703
December, 1923	239	632,193	231	634,300
November	216	575,102	218	605,923
October	226	605,211	239	649,791
September	205	548,914	169	444,881
August	235	605,671	249	639,802
July	237	602,017	227	587,966

### Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)  
(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	90	195,704	63	149,736
June	94	214,439	75	179,939
May	99	219,934	76	216,237
April	82	195,774	82	232,501
March	80	203,260	66	190,240
February	86	224,309	64	186,373
January	60	151,915	53	155,550
December, 1923	78	227,055	64	190,644
November	78	198,122	54	135,077
October	93	241,457	64	178,279
September	92	236,293	74	182,700
August	97	251,295	73	180,771
July	109	269,158	77	177,700

### Norfolk and Newport News

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	30	78,138	102	301,920
June	36	105,301	83	235,667
May	27	73,846	94	269,752
April	27	82,382	83	234,550
March	19	55,501	81	243,065
February	36	105,233	90	259,085
January	31	96,074	79	249,575
December, 1923	30	86,444	75	219,325
November	24	65,263	83	239,807
October	18	56,473	65	188,805
September	14	37,823	65	184,646
August	36	113,070	81	244,366
July	41	108,465	108	296,197

### San Francisco

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	54	188,984	57	196,854
June	63	226,130	62	197,082
May	52	161,682	72	172,155
April	57	190,588	62	210,134
March	53	185,226	59	211,896
February	65	215,020	68	229,206
January	63	209,105	68	234,960
December, 1923	69	281,081	70	243,152
November	56	205,175	71	249,035
October	43	165,798	63	209,930
September	64	208,625	65	224,918
August	68	244,530	58	189,348
July	59	204,204	65	227,566

### Boston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	139	351,477	99	193,747
June	147	283,982	110	200,026
May	122	260,300	100	219,216
April	100	282,324	63	165,557
March	89	262,438	50	132,862
February	99	307,627	44	133,504
January	84	250,335	47	116,832
December, 1923	102	285,125	48	130,115
November	91	305,230	60	166,404
October	118	354,296	59	156,940
September	117	307,719	79	185,726
August	126	302,391	86	178,706
July	146	337,033	85	174,106

### Galveston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1924	41	133,079	55	170,181
May	58	148,758	69	200,846
April	54	154,343	67	196,610
March	57	176,379	88	287,398
February	55	152,950	80	236,761
January	70	210,110	96	317,105
December, 1923	71	219,767	106	313,231
November	61	172,824	95	301,148
October	83	209,343	108	334,544
September	64	164,854	100	290,715
August	69	172,330	92	257,371
July	70	178,601	77	198,200
June	77	178,013	82	209,893

### Seattle

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	35	156,626	47	197,330
June	50	211,828	45	175,319
May	46	188,853	43	177,581
April	46	196,591	53	220,763
March	57	236,620	45	191,152
February	48	189,146	54	213,851
January	57	233,002	60	242,577
December, 1923	48	206,466	52	224,112
November	48	199,115	46	191,022
October	39	184,717	47	200,668
September	32	142,052	40	159,006
August	39	173,885	37	163,188
July	30	148,607	32	149,239

### Portland, Me.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	18	43,926	22	49,365
June	20	34,631	19	31,911
May	19	33,970	21	40,832
April	17	75,406	21	91,045
March	23	79,648	22	72,517
February	20	67,476	22	69,594
January	22	56,749	23	59,235
December, 1923	29	104,724	26	100,583
November	25	80,910	24	74,849
October	19	39,456	15	32,471
September	9	22,724	10	25,582
August	11	24,155	8	18,838
July	8	18,148	9	17,770

### Key West

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	94	110,228	91	106,127
June	54	65,770	58	71,102
May	98	110,675	95	104,661
April	92	95,435	85	90,677
March	103	112,577	89	97,276
February	83	83,118	78	84,678
January	69	79,224	70	82,775
December, 1923	71	88,377	71	91,121
November	80	97,642	85	97,599
October	83	103,328	82	95,506
September	69	77,687	74	84,612
August	80	94,591	82	93,028
July	88	96,514	86	97,260

### Mobile

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	77	161,386	81	166,218
June	90	196,589	73	164,783
May	74	146,668	80	157,655
April	80	158,109	70	133,920
March	83	178,637	84	182,491
February	79	168,182	86	174,517
January	81	158,416	83	159,081
December, 1923	83	165,163	75	156,579
November	74	148,297	78	145,886
October	68	123,532	60	120,606
September	60	126,005	52	105,247
August	64	191,968	67	146,191
July	73	136,242	66	123,405

### Providence

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	8	27,747	7	28,730
June	5	21,873	4	10,456
May	10	23,795	4	17,931
April	9	30,592	6	18,959
March	7	33,895	6	23,517
February	10	39,388	8	35,236
January	8	33,215	7	28,927
December, 1923	12	43,345	7	23,294
November	5	23,038	6	15,700
October	8	30,248	9	24,821
September	9	31,514	12	41,646
August	9	34,323	9	27,664
July	10	25,155	7	29,316

### Portland, Oreg.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	11	45,451	22	84,195
June	16	58,889	21	72,663
May	26	90,286	33	115,504
April	27	103,891	32	118,406
March	23	85,301	35	130,528
February	12	47,848	25	97,674
January	30	99,748	34	120,487
December, 1923	30	113,362	34	120,487
November	21	78,191	48	174,275
October	23	86,194	41	138,470
September	17	64,218	31	106,478
August	19	66,048	24	86,474
July	22	87,147	25	87,419

### Houston

(Exclusive of Domestic)

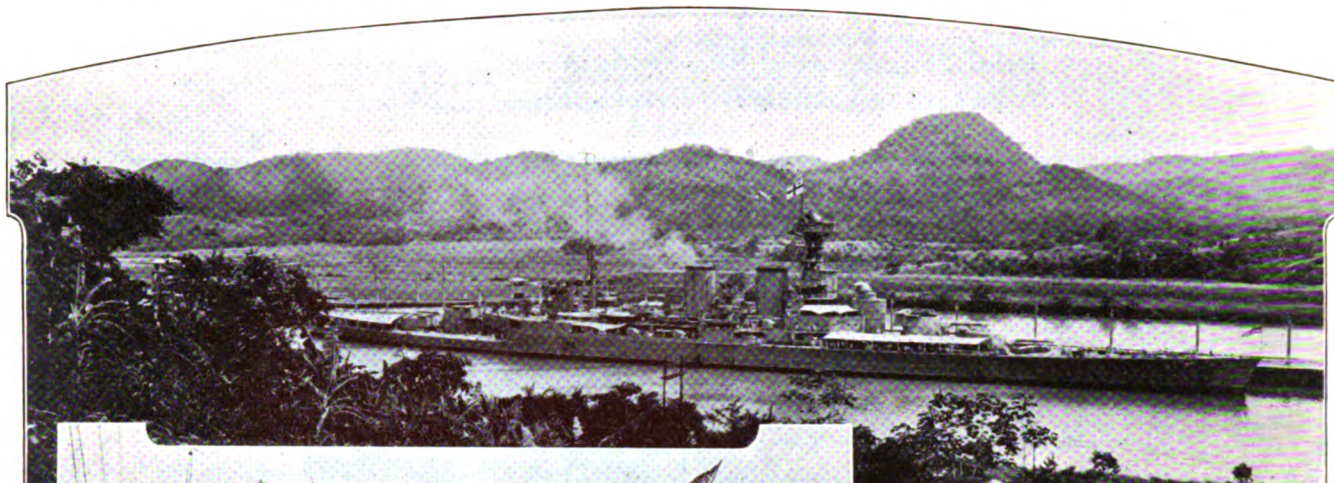
Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
July, 1924	59	77,062	57	288,417
June	65	74,794	72	336,312
May	72	64,937	71	342,350
April	78	76,466	73	337,757
March	88	113,064	87	411,715
February	62	82,601	65	228,178
January	60	55,037	58	267,066
December, 1923	74	73,876	70	304,359
November	84	83,490	82	350,703
October	75	24,076	70	268,416
September	66	58,704	61	92,664
August	58	43,258	56	211,348
July	48	42,447	48	177,666

# Late Flashes On Marine Disasters

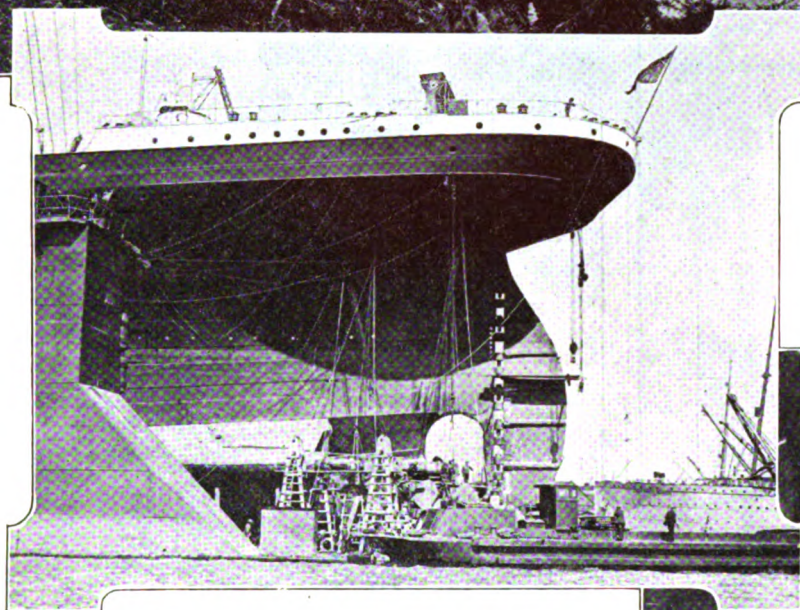
Brief Summaries of Recent Maritime Casualties—  
A Record of Collisions, Wrecks, Fires and Losses

NAME	DATE	NATURE	PLACE	DAMAGE RESULTING	NAME	DATE	NATURE	PLACE	DAMAGE RESULTING
Avio	July 10	Fire	Port St. Joa	Total	Ludwigshafen	July 29	Disabled	Falmouth	Prop. lost
Antinous	July 10	Struck sub. obj.	At sea	Not known	Langell Boys	July 27	Disabled	off Towas	Broke shaft
Aymeric	July 15	Hit pier	Dairen	Damaged	Lona	June 21	Collision	Alands Haf	Abandoned
Asuncion	July 16	Ashore	Corea	Not known	Leodium	June 27	Grounded	nr. Santa Fe	Floated
Augusta	July 23	Disabled	New York	Feed pipe	Luna	July 7	Struck obj.	Newcastle-on-Tyne	Not stated
Amasa Stone	July 24	Collision	Parisian Is.	To 5 plates	Lake George	Aug. 3	Disabled	Lake Superior	Not stated
Albany	June 23	Grounded	Buenos Aires	Floated	Lulea	July 20	Grounded	nr. Nykobing	Eng. trbl.
Ayandijk	June 30	Stranded	nr. Samsoun	Not known	Lunenburg	July 25	Collision	River Scheldt	Stranded
Ansaldo San Giorgio I	July 10	Disabled	Bahia	Crank broke	Linkmoor	Aug. 4	Struck sub. obj.	nr. Little Metis	Leaking; beached
Achroite	July 11	Ashore	Ouistregam Canal	Not known	Leviathan	Aug. 7	Disabled	At sea	Lost prop.
Admiral Cochrane	July 6	Grounded	Buenos Aires	Not known	Milandi	July 15	Not stated	Provincetown	Sunk
Annette	July 16	Hvy. weather	Fishcombe	Lost anchors	M.P.T. No. 12	July 16	Capized	Constable Hook	Partly sub.
Benmore	July 13	Disabled	New York	Frpk. leak.	Midland Beach	July 16	Broke down	New York	Not stated
Borec	July 16	Disabled	At sea	Leaking	McKeever Bros.	July 19	Fire	New York	Slight
Bratland	July 17	Aground	Miami	Floated	Munsomo	July 21	Disabled	New York	To rigging
Bergensfjord	July 26	Explosion	Christiana	Badly dam.	M. E. Farr	July 24	Collision	Parisian Is.	Slight
Birkenhead	July 29	Disabled	Key West	Pump and valves	M. & J. Tracy	July 25	Disabled	New York	Prop. broke
Betterton	July 27	Disabled	Guantanamo	Eng. trbl.	Milwaukee	July 23	Hit dock	Halifax	Not stated
Bodil	June 24	Disabled	Dover	Mchy. def.	Margherita	July 10	Collision	Genoa	Sunk
Burdale	June 23	Collision	Buenos Aires	Damaged	Moonshine	July 2	Hvy. weather ashore	Carrickfergus	Broke in two
Balmiel II	July 16	Collision	River Mersey	Not known	Miranda	July 2	Adrift	Belfast	Heavy
Banyei Maru	July 25	Ashore	off Kitami	Not known	Nelson	July 16	Collision	Tampico	To bulwark
Chattanooga	July 18	Aground	Belle Isle	Jettis. cargo	Nicolas Jean	July 2	Collision	Rouen	Aground
Celaeno	July 19	Ashore	Dry Tortugas	Undamaged	Numidia	July 3	Disabled	Marselles	Slight leak
Charles Hubbard	July 25	Broke shaft	Milwaukee	Lost wheel	Nordland	July 3	Disabled	Brunsbüttelkoog	Boilers leak.
Cananova	July 24	Leaking	North River	Sunk	Nishmaha	July 17	Explosion	Falmouth	Not stated
Cuba	July 28	Disabled	Columbia River	Lost prop.	Oscar D. Bennett	July 24	Aground	Petaspco River	Floated
Colonial	July 2	Fire	Norfolk	Unknown	Ossining	July 17	Disabled	New York	Prop. broke
Cherub	June 29	Disabled	Folkstone	Mchy. def.	Orion	July 30	Collision	Antwerp Dock	Slight dam.
Cambalu	July 8	Fouled lock	Newcastle-on-Tyne	Not known	Prometheus	July 14	Fire	260 m. E. Bermuda	Eng. rm. & aft. part.
Carterside	July 17	Ashore	nr. Ramsgate	Not known	Pizarro	July 17	Dragged, coll.	New York	Slight
City of Gloucester	Aug. 5	Collision	Nahant	Undam.	President Lincoln	July 19	Fire	San Francisco	Slight
Dillwyn	July 18	Disabled	nr. New York	Eng. trbl.	Pollux	June 23	Disabled	Brunsbüttelkoog	Slight to eng.
David McKelvey	July 18	Collision	Panama Canal	Damaged	Port Chalmers	July 11	Grounded	Ridge	Floated
Drill No. 14	July 29	Fire	New York	Considerable	Robert Dollar	July 15	Fire	Shanghai	Not stated
Dunvegan	June 24	Hit rock	Guernsey	Not known	Radio	July 17	Fog, coll.	Cape Cod	Bwsprt. & hdr.
Deerhound	July 2	Grounded	Shoreham	Not known	Robert L. Barton	July 25	Not stated	Block Island	Sunk
Debreczen	July 4	Disabled	Portland Rds.	Not known	Royston Grange	July 1	Touched grd.	Chili	Slight leak
Ethel N	July 10	Sprung leak	Duck Is.	Water log'd.	Rogier	June 23	Struck object	Sulina	Lost prop.
Ervin J. Luce	July 18	Ashore	East Hyannis	Heavy	Redstart	July 4	Grounded	Ymuiden	Undam.
Eskbridge	July 23	Disabled	Philadelphia	Steerer. def.	Sand Craft	July 17	Rolled over	Chicago	Heavy
Enterprise	July 22	Collision	Portland	Sunk	Smithfield	July 14	Disabled	New York	Not stated
Eugene V. R. Thayer	July 29	Aground	New York	Not known	Shamrock	July 15	Grounded	Linckis Bay	Floated
Eagle Bost No. 26	July 15	Aground	Block Island	Not stated	Svealand	July 17	Disabled	Philadelphia	Def. mchy.
E. Rose	July 3	Disabled	King's Lynn	To pumps	Scranton	July 8	Aground	Harbor Beach	Mchy. dis.
Eleutherios K. Venizelos	July 6	Disabled	Pernambuco	Piston def.	Spokane	Aug. 1	Explosion	River Rouge	Eng. & wd. work
Fleswick	June 24	Disabled	At sea	Eng. trbl.	Sumanco	July 24	Ashore	Columbia River	No. 2 hold niled
Feddala	July 18	Disabled	Bermuda	Not stated	Silverpine	July 29	Disabled	New York	Eng. trbl.
Fair Lady	July 11	Explosion	River Quimper	Total loss	Silverway	July 29	Ashore	Caibarien	Not stated
Florence Cooke	July 21	Collision	Felling	Not stated	Sydhavn	June 26	Stranded	Norresundet	Not stated
Gleaner	July 23	Ashore	Sandy Point	Not stated	Strymon	July 2	Sunk	At sea	Total loss
Graziella	June 21	Collision	Alands Haf	Not stated	Samnanger	July 3	Ashore	Nuevitas	Undam.
Gragoata	July 17	Disabled	Belfast	Hwssp. broke	Skrub	July 3	Disabled	At sea	Slight to mchy.
Galatea	July 15	Eng. trbl.	Fiumicino	Not stated	Scottish Maiden	July 17	Struck sub. wreck	At sea	Not stated
Grotius	July 17	Disabled	Batavia	Steerer. def.	Trinconia	July 14	Grounded	nr. Drontheim	Tanks leak.
Geo. M. Embericos	July 21	Collision	Montevideo	Slight	Traveler	July 16	Not stated	Brooklyn	Sunk
Gluckauf	July 18	Hvy. weather	Ameland	Lost sails	Topila	July 16	Collision	Tampico	Heavy
Grenadier	July 24	Disabled	Antwerp	Eng. trbl.	Two Brothers	July 30	Struck rock	off Saybrook	Not stated
Golden Rod	July 28	Collision	Canso	Sunk	Trio	June 24	Disabled	Fredrikshavn	To rigging
Home	July 12	Fog, struck in straits	Belle Isle	Frpk. & tank filled	Trorfida	July 4	Hit bridge	Cardiff	Mast and bridge
Half Moon	July 13	Aground	Panama Canal	Slight	Tres Hermanos	July 9	Aground	Barcelona	Refloated
Hallgrim	July 16	Collision	Kobe	Beached	Toyotomi Maru	July 17	Hvy. weather	At sea	Funnel dam
Havre Maru	July 16	Collision	Kobe	Heavy	U.S. Transport St. Mihiel	July 18	Collision	Panama Canal	Not stated
Hugh Kennedy	July 31	Disabled	Buffalo	Sternpost broke	Verona	July 17	Collision	Cape Cod	Rails bent
H. Houghton	July 29	Grounded	Bois Blanc Is.	Not stated	Veribest	July 21	Fire	Brooklyn	Not stated
Hercules	June 23	Fire	Buenos Aires	Not stated	Valdenar Skogland	July 23	Fire	New Orleans	Slight
Highland Warrior	July 16	Disabled	Las Palmas	Slight eng. trbl.	Vaneuard	July 29	Hit obst.	Westport	To keel
Hercules	July 22	Disabled	Vigo	Rudder	Valnegra	June 23	Collision	Buenos Aires	Not stated
Halls Advance	July 24	Disabled	King's Lynn	Leaking	Witchcraft II	July 14	Grounded	Sandy Pt.	Leaky
Istrouma	July 16	Disabled	New York	Prop. broke	West Jena	July 13	Disabled	At sea	Tlshft. & prop.
Isaac Reed	July 20	Sprang leak	Point Arena	Sunk	Wauwastash	July 28	Fire	Tompkinsville	Not stated
James T. Morse	July 23	Ashore	Crotch Is.	Undamaged	Willemoes	June 23	Aground	St. Briec	Leak, badly
John Bracewell	July 19	Disabled	Port Greville	Hoist. eng.	Westborough	June 24	Hvy. weather	At sea	Leaking
Kielehavn	July 11	Struck sub. rocks	Bonavista Bay	Water in hold	Worrell Clarkson	Aug. 4	Hit dock	Duluth	Slight, to side
Kaskaskia (wreck)	July 15	Fire	New York	Not stated	Zillah	July 28	Ashore	Kelly Is.	Slight
Kingswood	July 20	Aground	Neches River	Floated					
Kifune Maru No. 3	July 4	Stranded	nr. Tokio	Sunk					
Kare	July 3	Collision	Antwerp	Slight					

# Photographs from Far and Near

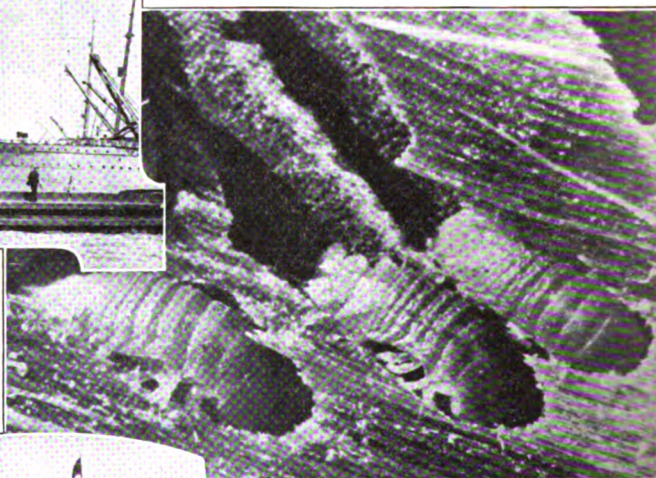


Great British warship Hood, largest, longest and speediest battleship in the world, passing through the Panama canal recently. She is 860 feet long

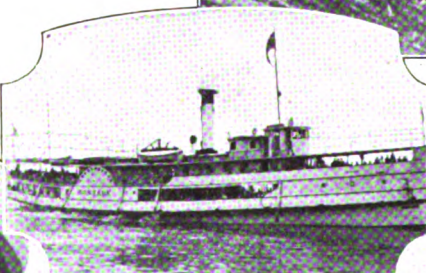


White Star liner Olympic, largest British built vessel, raised in big, new floating drydock at Southampton. The 46,000-ton weight was lifted 40 feet in 3 hours, 45 minutes

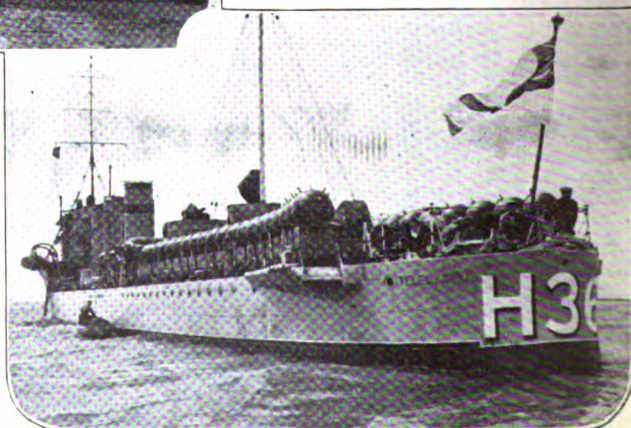
U. S. N. dirigible Shenandoah testing for the first time the mooring mast of the U. S. S. Patoka. The airship was moored for 19 hours



Iron steamboat Montauk still in service as a daylight excursion boat at Duluth

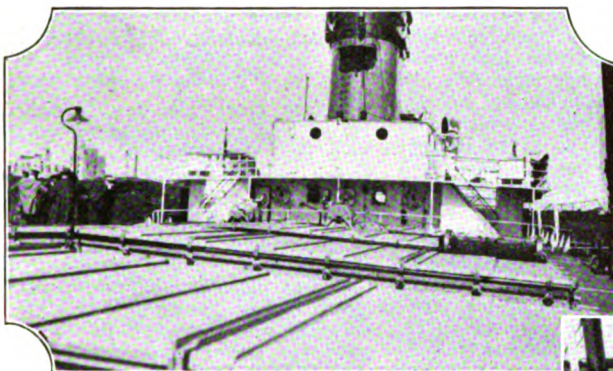
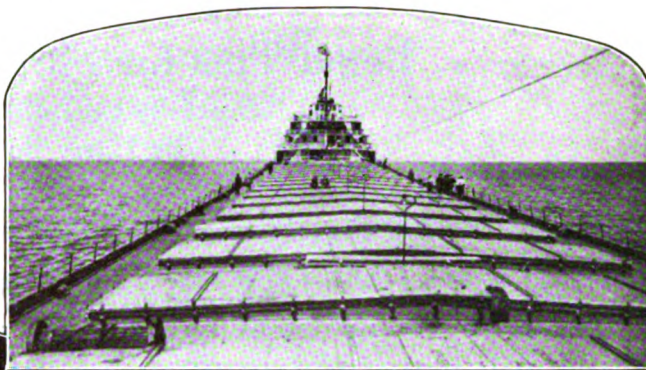


British mine layer Telemachus



# Latest Marine News in Pictures

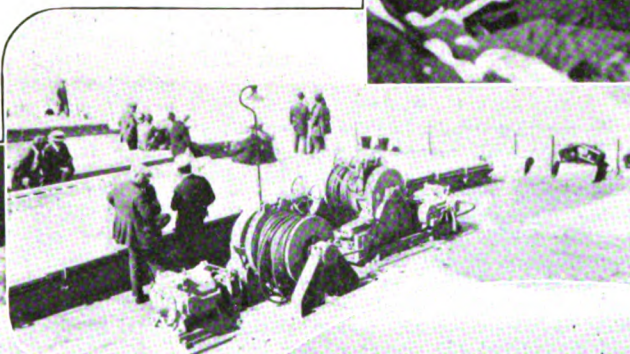
Views taken on board the Great Lakes motor-ship Henry Ford II on her trial trip Aug. 14. She was built by the American Shipbuilding Co.



Group of lake steamship operators enjoying the mystifying card tricks staged by one of the guests



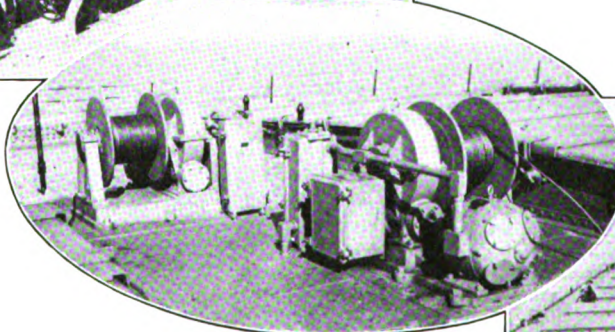
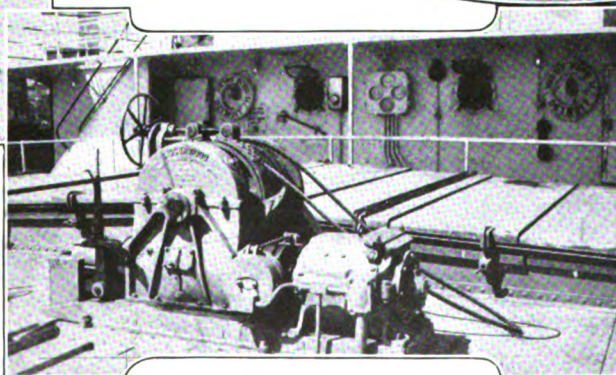
The big freighter has been thoroughly described in preceding issues of Marine Review. She is now in active service, carrying iron ore and coal



Mooring winches are automatically controlled to maintain a fixed pull on the lines



An interested guest, A. D. Black, secretary, Toledo Shipbuilding Co.



# Late Decisions in Maritime Law

## Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

ARTICLES providing for a voyage "from the port of New York to Vancouver, B. C., via Panama canal and such other ports and places in any part of the world as the master may direct, and back to New York, to a final port of discharge in the United States for a term not exceeding 12 calendar months," which articles were signed on or about June 19, 1915, did not permit the master to take his vessel to any part of the world that he chose, and did not anticipate a trip to Wales which was within the war zone. It is well settled that a seaman may treat as a breach of the articles a voyage which would expose him to a greater danger than he had reason to expect. "The proposed trip to Wales," it was held in the case of *KENTRA*, 286 *Federal Reporter* 163, "was not fairly to be anticipated by the crew. \* \* \* It was within the war zone, and hence perilous to both crew and owners."

"It has been held that a lookout in the pilot house or on the bridge, or in some instances the crow's nest, is not a sufficient compliance with maritime law. The statute does not prescribe where the lookout should be to discharge his duties, though the courts have repeatedly held that he must be placed where he can best hear and see objects on the water, and his proper position is generally understood to be in the forward part of the vessel, either at the bow or stern. An elevated position on a steamer is not regarded as favorable a place as that on the forward deck near the stern."—*WINDRUSH*, 286 *Federal Reporter* 251.

The transfer of liquor at night from a vessel in which it was brought from a foreign port to small boats, without the permission required by section 2872 of the revised statutes of the United States, for unloading at night, was an unlawful unloading within such section, though the transfer was made outside of the 3-mile limit, as the act of unloading continued until the liquor was landed, and such vessel, having hovered off the coast and unloaded the liquor within four leagues of land, subjected herself to the jurisdiction of a United States court and may be proceeded against for forfeiture.—*United States v. 1250 Cases of Liquor*, 286 *Federal Reporter* 260.

Wharfage is a necessity, but not a "necessary," in the sense in which the word is used in section 30 of the Jones act of June 5, 1920, giving liens for necessities, though credit was not given to the vessel. Wharfage is the basis of a maritime lien generally, and even in a vessel's home port. Where a vessel was

hired to a receiver forwarding cargo therefrom by various vessels, and the contract contained no provision that credit should be extended to any steamer to be docked, the credit was extended to the receiver and not to a vessel which with others used the wharf so as to support a lien for the wharfage against it.—*SUELCO*, 286 *Federal Reporter* 286.

Advances made to the owner of a vessel on the credit of such vessel to pay claims entitled to maritime liens have the lien and rank of the demands satisfied, it was stated in the case of *RUTH E. MERRILL*, 286 *Federal Reporter* 355, wherein it was further held that a mortgage of a vessel, not in possession, is not precluded by his interest from advancing money to the owner to discharge liens incurred in foreign ports, nor from subrogation to the liens so discharged.

The starboard hand rule does not apply where one of the vessels was not upon a steady course crossing that of the other, but was rounding to toward the anchorage grounds.—*BARENDRECHT*, 286 *Federal Reporter* 386.

A contract made by the agent of a shipowner with respect to a large early shipment of Spanish onions, that the ship should carry no other onions and fixing the number and order of other ports at which she should call, was not contradictory of the bills of lading, but should be construed as a part thereof, and the stopping of the ship at other ports, involving delay, was a deviation which deprived the owner of the benefit of exceptions in the bills of lading relating to damage to the shipment.—*ILE DE SUMATRA*, 286 *Federal Reporter* 437.

"It is considered well established that a vessel beginning her voyage in a time of year when storms at sea are prevalent, carrying grain, must install dunnage, so as to keep the cargo free from water which may reasonably be expected to appear during the voyage, either from strains and stress or weather or from other leakages."—*OAKLEY C. CURTIS*, 285 *Federal Reporter* 612.

"The rule is that a vessel, which relies on external appearance that she was in proper condition for stowage of cargo in lieu of tests, takes the risk of showing that the inspection and examination was diligently made."—*CHARLTON HALL*, 285 *Federal Reporter* 640.

Cancellation of a charter party by the charterer because of failure to have the vessel ready to receive cargo is not an abandonment of a claim for damages arising from expenditures for light-

erage made necessary by the breach of contract.—*ELMAC*, 285 *Federal Reporter* 665.

Where necessities are furnished to a vessel under circumstances giving rise to a lien, the furnisher's right to a lien is not affected by his charging the price against the person on whose orders he acted, and a stevedore, rendering services in loading or discharging a vessel in other than her home port, has a maritime lien therefor. Where it was understood that a premium for accident insurance was included in the contract price for stevedore services, the lien includes such premium.—*EL AMIGO*, 285 *Federal Reporter* 868.

It is well settled, it was said in the case of *EDWIN SLICK*, 286 *Federal Reporter* 43, that in narrow and winding channels, where each boat knows that the other must make prescribed turns at fairly definite points, and that, whenever they do meet, their courses will be approximately parallel, they are to be considered as meeting head on, and each boat has an equal duty to yield to the starboard.

The fact that a representative of the United States refused to permit a salvaged vessel to leave a port to which she had been brought by a government vessel until she gave a bond for payment of the sum due because of salvage services did not forfeit the right to salvage where no delay in the movement of the vessel resulted.—*JEAN L. SOMERVILLE*, 286 *Federal Reporter* 35.

The refusal of the master of a towboat to render assistance to a barge, which had been left at anchor by its own tug, and his threat to leave the barge unless his exorbitant demand for \$15,000 for towing the barge into port was acceded to, amounted to moral compulsion, and the contract signed by the master of the barge to pay the amount demanded was thereby invalidated.—*Magnolia Petroleum Co. v. National Oil Transport Co.*, 286 *Federal Reporter* 40.

"Steamers are not to be considered as meeting head and head unless both the color lights of each are in view of the other, and \* \* \* the risk of collision exists if the bearing of the approaching vessel does not appreciably change as the approach continues. \* \* \* It follows that, where each boat sees only one light of the other, and the lights are properly screened, and the bearings of the boats to each other continue constant, they are approaching 'obliquely,' so as to involve risk of collision."—*EDWIN SLICK*, 286 *Federal Reporter* 43.

# Late Decisions in Maritime Law

## Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

**O**RDINARILY the failure of a charterer to have the cargo in readiness for loading does not relieve him from responsibility for delays suffered by the vessel without her fault. If coal intended for delivery to the chartered vessel was commandeered for public use in time of war, and the vessel was not given berth on account thereof, then they would be released from liability, as a seizure under such emergency was an occurrence coming within the exception in the charter party.—Charles E. Hires Co. v. Porto Rico International Corp., 285 *Federal Reporter* 645.

Where a vessel from a foreign port, carrying a quantity of liquor, proceeded to a point off the coast of Rhode Island within four leagues of the coast, where she was met by a barge towed by a tug, and the liquor was there transhipped to the barge, which was towed by the tug to a pier in New York, where the cases and barrels containing the liquor were unladen from the barge and brought on shore without any permit from any collector of customs or any naval officer for said unloading, as required by section 2872 of the revised statutes of the United States, the tug was subject to forfeiture under section 2874 of such statutes, it was held in the case of *United States v. DOLPHIN*, 285 *Federal Reporter* 881, the tug being equally guilty with the barge. In reaching this conclusion, the court considered the holdings of various courts construing the relationship of a tug to the cargo of a barge, and pointed out that if the tug and barge are owned by distinct owners, the tug is not held to be engaged in transporting merchandise, so as to come within a statute limiting liability. So, also, when the tug is owned by the party chartering the barge and the cargo belonged to that party, and when the tug and barge are owned by the same party and the barge is chartered to the owner of the cargo. "The relation between the tug and tow under ordinary circumstances," said the court, "is that of an independent contractor, not that of principal and agent. The tug is not the servant or employee of the tow, and the tow is not responsible for the acts of the tug \* \* \* nor are they to be treated as a single maritime adventure within the scope of the law of general average."

"Shipowners and captains should understand that they are not likely to recover claimed damages in an admiralty court, unless they make known the claim and injury with sufficient promptness to afford the opposite party a reasonable opportunity to investigate and defend. Admiralty courts are not bound, at present, by any statute of limitation,

but refuse to enforce stale claims, where there has been such an unreasonable delay in the assertion thereof that the resultant belated enforcement of such a claim would be unjust and inequitable." In the instant case no notice of injuries claimed to have been suffered by a vessel because of the negligence of a tug in towing it along a shoal was given for almost two years, and suit was not brought for nearly four years. The court held that the libel should be dismissed because of libellant's unreasonable delay, precluding the tug owner from having any opportunity to investigate the nature of the damage or the cause of the injury.—*Great Lakes Transportation Co. v. Hard & Johnson Tug Line*, 289 *Federal Reporter* 130.

Freights may be assigned independently of the ship, and when such an assignment has been made, an assignee of the freights from the mortgagee is entitled to such freights as are earned while the mortgagee is in possession.—*In re Atlantic, Gulf & Pacific Steamship Co.*, 289 *Federal Reporter* 145.

A lien for supplies is not waived by permitting the vessel to leave the port.—*OWEGO*, 289 *Federal Reporter* 263.

One furnishing coal to a tug, taking slips, signed by the master, stating that it was sold on the credit of vessel and owner, for which it sent bills monthly to the owner, was entitled to a lien for so much of the account as remained unpaid.—*J. W. Scott*, 289 *Federal Reporter* 495.

The issues in the case of *OWEGO*, 298 *Federal Reporter* 263, concerned the power of a court of admiralty to appoint a receiver on motion of the master or creditor other than a mortgagee. In holding that the court is without power to appoint a receiver to operate a vessel, in a suit *in rem* to enforce liens other than a preferred mortgage, the court said: "A court of admiralty has not the characteristic power of a court of equity. \* \* \* It can not determine issues between parties as a court of conscience, and correct errors, declare or enforce trusts, or adjudicate matters of account, reform instruments, or issue injunctions, \* \* \* or take cognizance of mutual mistakes \* \* \*, unless brought before it as subsidiary to matters of which it has undoubted jurisdiction \* \* \*. A court of admiralty, in its decisions upon the ultimate rights of parties, may be moved from consideration of conscience, justice, and humanity, sometimes, to mitigate against the severity of contracts and moderate exorbitant demands \* \* \*, but it is not a court of chancery and has not chancery juris-

diction. \* \* \* The appointment of a receiver is not a right, nor a step in the determination of a right; it is merely an ancillary and incidental remedy; it is a means of preserving property for the satisfaction of substantive rights. No doubt parties might agree in a maritime contract for the appointment of a receiver upon a given contingency, no other right intervening, or the congress may provide \* \* \* for the appointment of a receiver."

Where a master was duly licensed, no fault could be imputed to a vessel collided with from the fact that such master was but 19 years of age, where the vessel was a powerboat of but 13 tons burden, 43 feet long, and not engaged in carrying passengers, it was held in the case of *EAGLE*, 289 *Federal Reporter* 661, in which the court also held that a colliding vessel is never exonerated from liability for her failure to keep a lookout, unless it appears that the collision would have occurred notwithstanding such failure.

The fact that a barge in tow, which came in collision with an anchored vessel, steered badly and had a tendency to sheer, does not exonerate the tug, but that fact placed on the tug the duty of greater care. A charterer of a tug, which in its contract of towage agreed to be answerable for all damages from collision arising from negligence of its employees, can not limit its liability for such damages.—*E. S. Atwood*, 289 *Federal Reporter* 737.

"Generally speaking," said the court in the case of *Cassil v. United States Emergency Fleet Corp.*, 289 *Federal Reporter* 774, "a seaman is any one who, by contractual engagement with the owner, master, or charterer of a vessel, serves the vessel in navigation. He is not necessarily a sailor. He may be a cook, fireman, or even a bartender. A stevedore renders no service in actual navigation. It is true that he renders service incidental to navigation in loading and unloading vessels, a service which is maritime in its nature but he is a landsman and he does not belong to the vessel, nor does he go with the vessel."

One having a contract with a steamship company to furnish fuel oil to certain vessels, who, on order of the company, furnished oil to a vessel not named in the contract, the ownership of which he did not know, and without inquiry, which would have disclosed that the company was a charterer, without power under the terms of the charter to bind the vessel was under act of June 23, 1910, section 3, not entitled to a lien.—*ADMIRAL GOODRICH*, 288 *Federal Reporter* 362.

# Develops New Design of Diesel

Worthington Company Announces New, American  
Designed, 2-Cycle, Double-Acting Engine

**A**NNOUNCEMENT has just been made by the Worthington Pump & Machinery Corp., New York, of its development of an entirely new design of 2-cycle, double-acting diesel engine. The company's announcement, as made Aug. 28 when a group of marine engineers and executives inspected the engine at Buffalo, contains the prediction that the new engine combines a fuel economy comparable with that of the best existing types of diesel engine, with dimensions, weight and construction cost per horsepower approaching those of reciprocating steam machinery. The first unit built in the Buffalo plant of the Worthington corporation, is conservatively rated at 600 to 800 horsepower for a single cylinder unit, at speeds of 90 to 120 revolutions per minute.

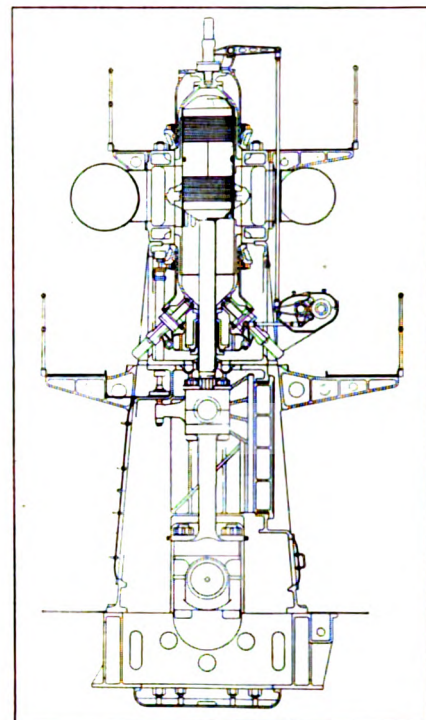
The new Worthington engine was wholly designed and built in America, without recourse to European patents. The company has had 24 years of experience in building internal combustion engines, culminating in nearly four years of intensive research, study and experiment aimed directly at the production of a new engine. The Worthington corporation has been active in American diesel engine production since 1912, in which year the first wholly American design

of engine of this type was developed in the company's Buffalo shops. Nearly 100,000 horsepower of its diesel engines are now in active service in the United States. The company's type of gas engine has been known since 1900, and more than quarter of a million horsepower of such engines, including the largest double-acting gas engines ever built, are now in use.

The immediate inspiration behind the research campaign was to develop an engine adapted for use both in new ships and in converting high cost steamships to diesel drive. The leading collaborators in the long research were O. E. Jorgenson, a diesel engineer of international reputation, for the past five years a member of the Worthington technical staff, and Dr. C. E. Lucke, professor of mechanical engineering of Columbia university, New York.

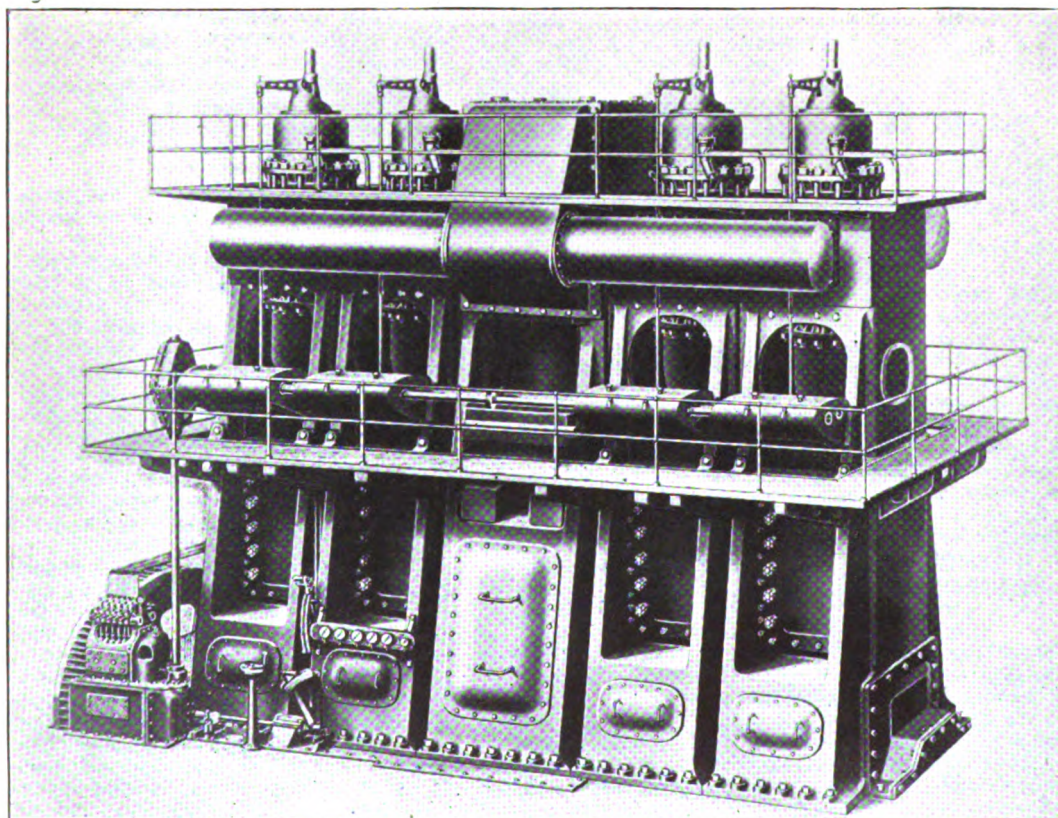
The basic principle underlying the Worthington engine may be briefly explained. In the 4-cycle diesel engine, one stroke in four is a power stroke, in the 2-cycle engine, one stroke in two, in the new engine every stroke is a power stroke. Its working cycle, therefore, is virtually the same as that of a reciprocating steam engine.

The principle, of course, is not a novel



SECTION THROUGH NEW DIESEL

one, but mechanical difficulties, chiefly concerned with the complicated heat stresses in the cylinder of a double-acting,



FOUR-CYLINDER UNIT  
OF 2-CYCLE, DOUBLE  
ACTING DIESEL EN-  
GINE READY FOR IN-  
STALLATION ON BOARD  
SHIP

engine, have always been a problem. Many advantages are claimed for the double-acting type. The balance of the moving parts, for example, is greatly simplified, and the weight saving, not only from the manner in which the required power per cylinder is distributed through four strokes instead of being concentrated in one, but also from the decreased provision needed to care for the momentum of moving parts, and in other ways, is important.

The cylinder of the new engine might be described as composed of two single-acting cylinders, opposed end for end and working in opposite directions, their respective pistons flanged to the same rod. The scavenging and exhaust ports, cooling water circulation and expansion provisions of the two are virtually independent of each other. After incorporating this fundamental idea, the design is quite simple, following in all respects the best modern standards in diesel engine practice. The plan followed for insuring the maximum strength and rigidity in the cylinder construction, combined with the necessary freedom for expansion and uniformity of heat transference, and with economy in materials, is simple and effective.

The valve gear presents no particular novelty in design. Three fuel spray valves are provided, one on top of the upper end of the cylinder, and two in the bottom head on opposite sides of the piston-rod, entering at an angle. One of the main points of the design is the manner in which these two valves are worked out so as to give uniform and symmetrical distribution of the charge around the piston rod.

The reversing mechanism, as a point of interest, is second only to the cylinder design. Each of the three valves has its own cam, all three geared to the same shaft. The cams are symmetrical, and all that is necessary to reverse the running direction is to shift all three cams simultaneously through 34 degrees on the shaft. This is accomplished by a worm shaft, which in turn is actuated by an oil-operated hydraulic mechanism controlled by a 4-way cock, this in turn being operated by a single lever on the maneuvering platform.

The engine is started and stopped by a single lever, which as it is moved forward successively opens the air starting valves, then the fuel supply valves, simultaneously closing the air starting valves. The lever is then capable of setting, by a ratchet and pawl, at any desired fuel supply. To stop, all that is necessary is to throw this lever back to the stop position. The starting and stopping lever and the reversing lever, though independent of each other in all other respects, are interlocked so that the engine must be brought to a full stop before reversing.

## From the Old Log Book

Stray Items from MARINE REVIEW Files of  
10, 20, 30 and 40 Years Ago

September, 1884

**L**ARGEST wooden, screw steamship built up until that time was launched at West Bay City, Mich., on Sept. 2. Capt. James Davidson was the builder. Our files of 40 years ago give a full description of the "monster" steamer AUSTRALASIA. She was 305 feet long, 40 feet beam, 22 feet deep. Her main keelsons were 17 x 16 inches. A center truss bolt was used for the first time to prevent hogging. She carried about 3000 tons of ore, 100,000 bushels of wheat and cost \$150,000.

\* \* \*

The missionary ship *Morning Star*, an auxiliary steam barkentine, was launched by the New England Shipbuilding Co., Bath, Me. She was built with money subscribed by Sunday school children, cost \$40,000 and was wanted to carry the gospel to the South Sea Islands. Champagne was ruled out and Florida water was used. The file shows that "this sent up its fragrance to heaven like a peace offering between the city and sea."

\* \* \*

Puck gets credit for this poem.  
When a steamer meets another,  
Coming thro' the fog,  
Which should turn out for the other?—  
Comin' thro' the fog.

This question is quite hard to wrestle.  
Until we read the log,  
Which clears from blame the lucky vessel  
That has come thro' the fog.

September, 1894

Certain problems are always with us. Present agitation about the Chicago habit of draining water from the Great Lakes, finds a parallel in a protest by Richard P. Joy against Chicago being permitted to open its drainage canal.

\* \* \*

The steamer *S. S. Curry*, owned by the Hawgood & Avery Transit Co., set a new coal carrying record for lake vessels. She hauled 4535 net tons of soft coal from Conneaut, O., to Gladstone, Mich. She beat the record of the *Selwyn Eddy* by 283 tons.

\* \* \*

Records for lake vessels were held by MARITANA, Minnesota Steamship Co., with 4260 gross tons of iron ore; SELWYN EDDY, Eddy Transportation Co., 130,820 bushels of wheat; CENTURION, Hopkins Transportation Co., 147,812 bushels of

corn; ONOKO, Minch estate of Cleveland, 187,657 bushels of oats; and the CURRY with the above coal record. The speed record was held by the OWEGO of the Union Line of Buffalo which went from Buffalo to Chicago, 889 miles, in 45 hours and 16 minutes, a rate of 16.4 miles per hour.

September, 1904

The great MINNESOTA was inspected by thousands at New York just before sailing for Seattle on her maiden trip. President Charles R. Hanscom of the Eastern Ship Building Co., New London, was the designer and builder, James J. Hill, the owner, giving him full rein to build the MINNESOTA and DAKOTA, without even drawing up a contract. The yard itself was new, being built to build these ships. They were 630 feet long. (The MINNESOTA, within the past year, has been towed to Germany where she has been broken up for scrap.)

\* \* \*

Robert Logan, assistant general manager of the American Ship Building Co., arranged for Edward Hopkins, naval architect and designer for the Detroit Ship Building Co., to go to Cleveland and superintend construction of a new passenger liner for the Anchor Line.

\* \* \*

The biggest ship on fresh water was able to move about the Duluth-Superior harbor without aid from tugs and the sight, says the Duluth correspondent, sent cold shivers down the backs of tugmen. The ship was the *Wolvin*.

\* \* \*

The Fore River Ship & Engine Co., Quincy, Mass., now part of Bethlehem, was given credit for recent ship construction. Among these were the 7-mast schooner THOMAS W. LAWSON. Others were the 6-mast schooner WILLIAM L. DOUGLAS and the coastwise steamer BOSTON for the Old Colony Steamboat Co.

September, 1914

The European war filled the horizon and MARINE REVIEW had a strong editorial on "A Nation Without Ships." Shipping was demoralized and on the lakes, the mental viewpoint of the shipowner fulfilled the words of Milton. "Abandon hope all ye who enter here."

# Builds Lake Liner

Lake Yard Delivers \$3,500,000

Side Wheel Passenger Vessel



MAIN SALOON ON THE NEW STEAMER GREATER DETROIT. THE BEAUTIFUL MAIN CEILING ARCHES THREE FULL DECKS ABOVE THE PROMENADE DECK

THE new sidewheel combination steamer GREATER DETROIT, recently completed by the American Shipbuilding Co., Cleveland, for the Detroit & Cleveland Navigation Co., Detroit, went into commission on the route between Detroit and Buffalo Aug. 26. She is the largest passenger steamer ever launched on the Great Lakes and cost \$3,500,000 to build. Her sister ship, GREATER BUFFALO, which was launched about the same time and was constructed from the same plans, will be placed in commission on the Detroit and Buffalo run as soon as she is completed.

The GREATER DETROIT was launched at Lorain, O., Sept. 16, 1923, from the yards of the American Shipbuilding Co. The steel hulls of the two vessels were later towed from Lorain to the yards of the American company at Detroit, where the two great ships were completed under the personal supervision of Frank E. Kirby, the veteran marine architect of Detroit and New York, who designed both vessels.

Frank E. Kirby, master shipbuilder, is a modest man averse to publicity, but the world has beaten a path to his door. When the Russian government wanted ice crushing boats that could keep its frozen harbors open they sent a royal commission to this country to consult Mr. Kirby. After the SLOCUM disaster in New York, he was called to Washington by the late Theodore Roosevelt, and appointed a committee of one to revise the rules and regulations for safeguarding life in the United States marine passenger service. During the World war, he acted as consulting marine engineer for the government.

He has designed and supervised the construction of more than 150 steamers. He considers the GREATER DETROIT his masterpiece and a fitting monument to his years of toil to upbuild marine transport facilities. The GREATER DETROIT may be said to be a distinctive American

type and embodies the accumulation of years of experience by Mr. Kirby and by Herbert C. Sadler, D.S.C., naval architect and professor in the naval architecture and marine engineering department of the University of Michigan, who has been associated with him in the designs of many of the notable river and lake vessels.

For the particular service of the GREATER DETROIT and GREATER BUFFALO, the draft is limited to about 16 feet, the maximum breadth to 100 feet over the guards to enable them to get into the available drydocks.

The route these vessels are to follow has complicated the problem. It traverses the whole length of Lake Erie with shallow channels at both ends, a distance of about 260 miles, which must be made on express schedule. In addition to the primary consideration of the passenger business, is the automobile and express freight transport which must be taken into consideration. An unusual but predominating influence is impressed upon the design by the shortness of the operating season, for it is necessary to secure the entire annual revenue in a season usually less than eight months in duration.

## Details of Design

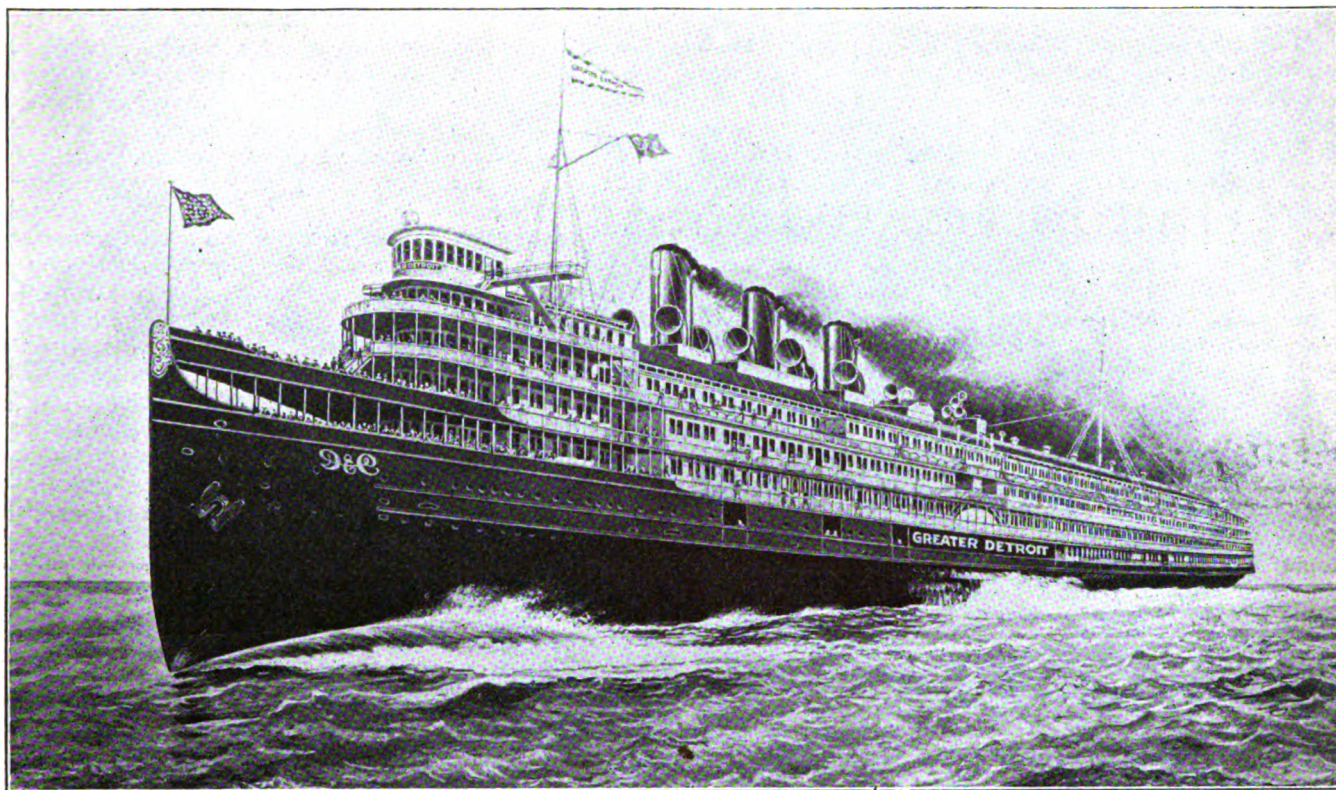
In the GREATER DETROIT the design follows the conventional side-wheel steamer characteristics, a yacht-like hull carrying a great superstructure of wood supported by steel, all of which overhangs the hull below and is carried by braces. These superstructure decks are each about three-quarters of an acre in area. The type of the stern is unusual and has not been

used before in this class of vessel. The principal dimensions: Length over all, 550 feet; breadth of hull, 58 feet; breadth of hull over all, 100 feet; depth molded, 23 feet 6 inches. This gives an extremely refined water-borne foundation for such a bulk of upper works. The utmost care coupled with the most exacting curtailment of all unnecessary weights has been demanded to prevent this vessel from running over her designed draft.

Some idea of the extent of the accommodations may be gained from the list of passenger rooms alone: Promenade deck: Rooms with two berths, 105; rooms with one berth, 32; rooms with two berths and toilet, 50; rooms with two berths, toilet and shower, 4; parlors with bath room, 12; parlors with toilet and shower, 2; total rooms, 205. Gallery deck: Rooms with two berths, 138; rooms with one berth, 24; rooms with two berths and toilet, 76; rooms with two berths, toilet and shower, 4; parlors with bath room, 12; total rooms, 254. Upper deck: Rooms with two berths, 166; total rooms, 166.

These accommodations require a great many accessory rooms not only for the use of passengers, but also for housing and maintaining the crew of more than 300 officers and men.

The GREATER DETROIT has a rudder at each end, the one at the bow being necessary to facilitate handling in the narrow waters at each end of the run. The stern rudder, which is of the balanced type, is the larger of the two and has a stock 12 inches in diameter; it is operated by twin independent steering engines acting directly on the quadrant.



NEW STEAMER GREATER DETROIT, LARGEST SIDE WHEEL STEAMER EVER LAUNCHED ON THE INLAND WATERS OF THE UNITED STATES, 550 FEET LONG, 100 FEET BEAM, 650 STATEROOMS, 1168 PASSENGER BERTHS AND BEDS, COST \$3,500,000. SHE HAS JUST GONE INTO COMMISSION ON THE DETROIT-BUFFALO DIVISION OF THE DETROIT & CLEVELAND NAVIGATION CO.

The bow rudder is controlled by a single direct acting steering gear; the stock of this rudder is 9 inches in diameter. These steering gears are controlled from the pilot house.

The hull is steel. There are 11 watertight compartments in the length of the vessel, these being formed by steel watertight bulkheads extending from keel to main deck. The double bottom is subdivided into 16 watertight compartments. When necessary, the bulkheads are pierced for access and the holes fitted with watertight doors with hydraulic closing gear operated from the engine room.

#### Support For Upper Works

The steel casings around the stacks and also the vent shafts to the engine room and galley constitute an important feature in the support of the upper works as they form great, hollow pillars extending from the solid steel main deck up through the joinery which is somewhat dependent on them for support. There is a network of stringers, beams and pillars of steel under the promenade deck which system carries the superimposed network and conveys the stresses to and distributes them over the main deck.

The GREATER DETROIT has accommodations for the deck, engineers' and stewards' departments on a steel orlop deck both forward and aft of the machinery which is well forward of amidships. The freight space is on the main deck

forward and the lobby entrance, cafeteria and dining room are aft with galley and pantry and other necessary rooms on the orlop deck. Passenger accommodations are located on the promenade, gallery and upper decks.

The principal wooden structure is built of white pine; best clear California redwood for decks and partitions, and Oregon fir for carlins. The divisional bulkheads between rooms are built of matched redwood boards run diagonally and glued together, single thick. The partitions exposed in passages are of paneled white pine and the exposed walls in public rooms are paneled in selected hard woods. Composition panelings are used on ceiling work and also much ornamental plaster work.

All rooms are fitted with running water, and many with baths, toilets, showers and some with hot and cold water and necessarily the amount of plumbing work is large. The requirements as to drinking water are very strict and necessitate piping distilled water all over the ship. Raw water is carried in steel tanks of about 36,000 gallons capacity, and there are tanks of 8000-gallon capacity for sterilized water, which after being chilled, is pumped to drinking fountains throughout the vessel. Sterilized water is piped to all wash basins and generally throughout the ship. The violet ray system is used for sterilizing. Hot water is carried to all parlors, officers' quarters, public lavatories, slop sinks, etc.

The pumping equipment for the plumbing supply is in duplicate.

As the greater part of the operating season of GREATER DETROIT is during the heat of summer, the ventilating problem has received careful attention. Sheet metal ducts lead fresh air to all inside rooms. Toilet spaces are ventilated into the stacks where possible; ventilator heads exhaust the foul air from the top of the dome. The fans which are driven by motors are located on the main deck and drive the air through washers into the ventilation ducts which distribute it to all parts of the vessel.

#### Heating and Ventilation

To prevent as far as possible the heating of the air in the ship, care was shown in the insulation of engine and boiler casings, and the underside of the decks and at other parts of the structure which might communicate heat. In general, magnesia board covered with galvanized sheet metal has been used. During the opening and closing months of the ship's season, heat must be provided so radiators are placed in the public rooms and a single heating pipe is run through the outer row of rooms and wing passages. The whole heating system is drained by two vacuum pumps.

The remote possibility of fire has been most thoroughly guarded against by installing a complete sprinkler system with heads in all the staterooms, throughout

the public rooms and passages, over main deck cargo spaces, in quarters below deck and even in the pilot house. Fire detectors which automatically alarm the watchman of a rise in temperature at any point, are installed all over the ship. The underside of the promenade deck is insulated with galvanized sheet steel. Fire doors in cargo space and in passages leading to rooms are provided so as to divide the vessel into zones.

Steel hulls, double bottoms and watertight compartments render the steamer unusually seaworthy. Fifty per cent more life saving facilities than are required by the rules of the United States government are provided, including life preservers, steel lifeboats, rafts and floats. As another safety measure and also as a convenience for passengers, the steamer is equipped with a wireless system. Two wireless operators are constantly on duty.

#### Navigation Equipment

Every room on the GREATER DETROIT is provided with a telephone connected to a central station in the lobby on the main deck. The communication system of the ship is on a separate system of inter-communicating telephones.

The navigating equipment, in addition to the usually adequate complement of compasses, includes a modern Sperry gyro-compass and Sperry log, as well as a Haynes automatic sounding machine. The pilot house which is unusually large is built above the Texas deck and is

eight full decks above the surface of the water. The bridge has been extended out over the water on both sides of the ship to give the officers a full unobstructed view along the side of the ship beyond the stern. High power searchlights are placed on the ends of the bridge.

In addition to life rafts and floats, 12 metal lifeboats of 60 persons capacity and one metal work boat are carried under Steward davits. All boats are carried well aft and this leaves the forward portion of the boat deck clear for the groups of passengers who gather there to view the surroundings when the ship is nearing port. Hand winches are provided for handling the lifeboats and special structural reinforcements have been incorporated in the light wood superstructure for carrying the loads which are brought on it in handling such heavy weights.

Light and power for various uses are provided by three 100 kilowatt turbo-generators, located on the main deck. All wiring is in conduit. In all, about 5000 lights are used in the GREATER DETROIT and GREATER BUFFALO. Many of the operations of the galley are carried on by motor driven machine, requiring in all about 120 horsepower of motors.

The vessels are each equipped with 10 x 10-inch spur geared windlass, forward, and capstan windlass aft, two stockless anchors of 6000 pounds each, forward, and one stockless anchor of 6000 pounds weight aft. The cables are 2½

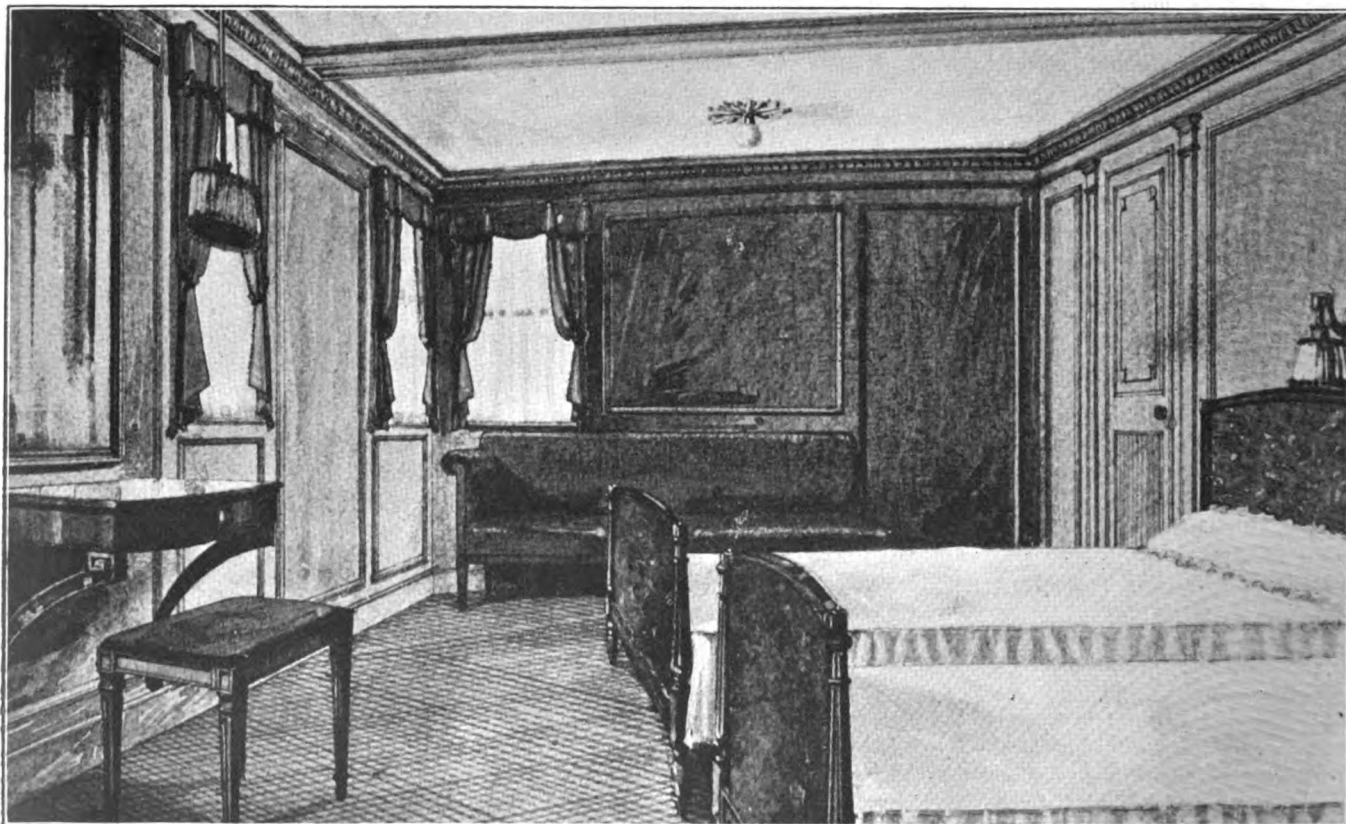
inch cast steel studded chain, 90 fathoms to each bower and 45 fathoms to the kedge. For making fast to dock seven 8 x 10-inch mooring engines, each equipped with 90 fathoms of 1½ inch diameter steel wire warp, are used.

#### The Power Plant

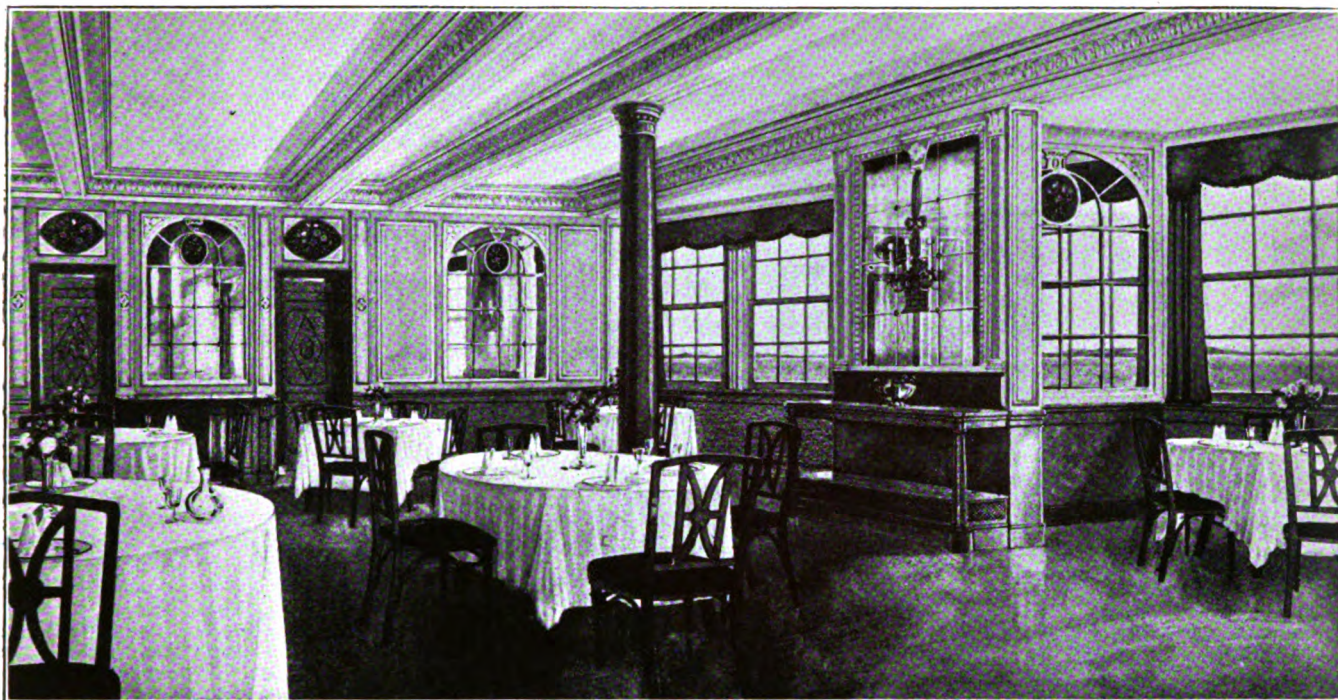
The power plant of the GREATER DETROIT and her sister ship the GREATER BUFFALO, consists of three double-end and six single-end boilers of the ordinary Scotch marine type, fitted with Howdens forced draft and superheaters, supplying steam for a 3-cylinder compound inclined engine, driving feathering wheels. This is the largest corliss type engine ever built.

All boilers are 14 feet in diameter; the single end boilers being 10 feet 6 inches long inside and the double end, 20 feet 6 inches long inside. All heads are in one piece double riveted to the shells. The furnaces are 54 inches inside diameter, Morrison type. The tubes are 2¾ inches outside diameter. All materials are worked out for a pressure of 167 pounds in accordance with the rules of the American Bureau of Shipping and the United States steamboat inspection service. The boilers are in three separate compartments, there being four fire holds and four bunkers extending athwartships. Two ash ejectors are installed in each fire hold.

The main engine cylinders are of the following dimensions: Low pressure, 96 inches; high pressure, 66 inches; low



PARLOR DE LUXE IN NEW STEAMER GREATER DETROIT. FINISHED IN FRENCH WALNUT, SATINWOOD, BIRDSEYE MAPLE AND ENAMELS, 24 OF THESE PARLORS ARE ON THE PROMENADE AND GALLERY DECKS



SECTION OF DINING ROOM IN NEW LAKE STEAMER GREATER DETROIT. THIS ROOM IS ON THE MAIN DECK AT THE STERN AND IS MORE THAN 80 FEET LONG WITH AN AVERAGE WIDTH OF 60 FEET

pressure, 96 inches; stroke, 108 inches. The cylinders are arranged with the high pressure cylinder between the two lows. The valves on the high pressure cylinder are of the poppet type with sickles gear; on the low pressure cylinders they are of the corliss type.

#### Construction of Engine

The engine framing consists of six forged steel tie struts connecting cylinders and pillow blocks. These are heavily connected to the keelsons and to each other, and are shaped to form guides for the crossheads. The engines are equipped with hand and steam reverse gear, steam turn over gear, and hydraulic jacking up gear to lift shafts sufficiently to allow of revolving boxes of gunwale bearing for removal and re-babbiting.

The cranks, pins and shafts are forged steel, the pins and shafts being hollow forged and all are open hearth carbon steel, oil tempered and annealed.

The wheels are of the feathering type designed to operate at 30 revolutions a minute, and are 32 feet, 9 inches outside diameter, with 11 floats 14 feet, 10 inches long, by 5 feet wide, of curved steel. The centers are cast steel, arms and braces forged steel, rims and cross ties rolled steel.

The air pumps, two bilge pumps and two feed pumps are driven off the main engine. In addition, the following independent pumps are carried: One simplex vertical auxiliary feed pump, 16 x 12 x 28 inches; one simplex vertical general service pump, 16 x 12 x 28 inches; two horizontal duplex sanitary and bilge

pumps, sanitary pump being 12 inch, bilge pump, 6 inch, common steam cylinder 14 inch, with 12-inch stroke; two horizontal duplex underwriters' fire pumps, 16 x 9 x 12 inches; one centrifugal ballast pump 14 inch, driven by compound steam engine, 8x14x10 inches; two vertical duplex raw water pumps, 8 x 10 x 12 inches; two horizontal duplex fresh water pumps, 5¼ x 4¾ x 5 inches; two horizontal duplex filtered water pumps, 5¼ x 4¾ x 5 inches; two horizontal duplex ice water pumps, 4½ x 2¾ x 4 inches; two simplex vacuum pumps, 6 x 8 x 12 inches. Other equipment includes one auxiliary jet condenser and air pump, two injectors, steam syphons in all holds, four ash ejectors, 7-inch discharge, one motor-driven garbage ejector in galley.

The designed speed of the GREATER DETROIT is 22 miles per hour, and on her trial trips, the new vessel was run at her contract speed.

#### Interior Decorations

Time and money have been used to full advantage upon the interior decorations of the GREATER DETROIT and GREATER BUFFALO. Rich simplicity is the keynote of the decorative scheme for the interior as outlined by Frank E. Kirby, the designer of the ship, and executed by W. & J. Sloane, decorators and furnishers, New York, in accordance with whose plans the details of the joinery were carried out, and by Albert Kahn, architect, Detroit, who acted in an advisory capacity. Arthur C. Keil, architect, Detroit, was also associated with Mr. Kirby, in charge of the joiner work.

### Discuss Marine Problems at Safety Congress

At Louisville, Ky., from Sept. 29 to Oct. 3, the National Safety council will hold its thirteenth annual safety congress. The marine section will meet on Sept. 30 and Oct. 1. "Marine Casualties" will be discussed in a paper by R. F. Edwards, Prudential Life Insurance Co., New York; "Practical Safety Supervision in the Merchant Marine," by Robert F. Hand, assistant manager, marine department, Standard Oil Co. of New Jersey; "Safeguarding the Lives and Limbs of Lake Seamen," by George A. Marr, secretary and treasurer of the Lake Carriers' association, Cleveland and "Reducing Accident Costs in Water-front Work and the Conflict Between Compensation and Admiralty Laws," by James F. Fouhy, manager, Smith Insurance Service Inc., New York.

A campaign has been started to raise \$10,000,000 for establishing a national museum of engineering and industry. A building located at Washington will house the original models of early inventions and records of constructive achievements of pioneers, inventors and engineers in the development of transportation and industry.

The steamer CARISCO, formerly operated between Boston and Port Ivory, S. I., was sold recently at Boston to the Buxton Line, Norfolk, Va., for \$26,100. The new owner will place the CARISCO on the route between Norfolk and Richmond.

# Business News for the Marine Trade

Fort Pierce, Fla., has voted \$30,000 for construction of municipally owned seawall and wharves.

United States war department has made \$694,000 available for work during the coming months including river and harbor work at Savannah, Ga. Maj. Dan L. Sultan is district engineer in that city.

Maj. Oscar O. Kuentz, district engineer at Wilmington, N. C., has \$346,000 made available by the United States war department for river and harbor work.

Camp Walton Boat Co., Du Funiak Springs, Fla., has been incorporated for \$25,000 with W. B. Harbeson as president and W. W. Harbeson as secretary.

O. R. McKinney, State National bank, Marlow, Okla., is interested in purchasing a used large dredge boat or two small drag line machines.

Bay Shore-Brighton Excursion Line, Baltimore, has been incorporated with \$25,000 capital, to operate a steamship line. Daniel J. Meyler, Charles Jackson and Arthur R. Padgett are incorporators.

The Lake Union Drydock & Construction Co., Seattle, is constructing fifteen 75-foot patrol boats for the United States coast guard to be used for patrolling Puget sound.

Trosdal, Plant & La Fonta, and Sgitovich & Co., have joined to form the United Gulf Steamship Co. E. S. Trosdal is president and T. R. Hancock and George Plant, vice presidents. The companies operate shipping board vessels.

Self-Bailing Lifeboat Co., Seattle, contemplates production on a large scale of a lifeboat which automatically bails itself.

Seaboard & Gulf Steamship Co., New York, has purchased the steamer LAKE FLAMBEAU, 4145 deadweight tons, from the Fleet corporation. Repairs estimated at \$75,000 are to be made by the new owner.

The Chesapeake Steamship Co. has awarded a contract to the Bethlehem Shipbuilding Corp., at \$200,000 for installing boilers in the steamers CITY OF NORFOLK and CITY OF BALTIMORE.

Shippers' Agency, Inc., New York, has been formed with \$100,000 capital, to act as agent for shippers in marketing all kinds of goods.

Steamer H. C. Rowe & Co., Inc., has been incorporated with \$20,000 capital, to build and operate boats, vessels, etc., with Patrick J. Dobson, Charles P. Schroetter and George V. A. McCloskey as incorporators. Franklin L. Mettler, Wilmington, Del., is agent for the company.

New York Raritan Canal & Philadelphia Steamboat Co., New York, has been incorporated for \$5000 to own and operate boats, etc., by R. Greenbaum, C. L. Fuller and J. H. Finkler, with Finkler & McEntire, 2 Rector street, New York, as attorneys.

Kingston Shipbuilding Co., Ltd., Kingston, Ont., has been incorporated with \$1,300,000 capital to construct and operate steamships and vessels, etc., by William S. Morlock, Sydney E. Wedd, Bruce V. McCrimmon and others.

American Ship Breaking Corp., New York, has been chartered at Albany, N. Y., with a capitalization of \$75,000 by H. L. Crawford, J. W. Becker and F. A. Mormy.

The Roosevelt Steamship Agency has been incorporated under the laws of Delaware with \$50,000 capital, by Arthur Skillman, New York; E. K. Raychie, Astoria, N. Y., and E. Skellette, Brooklyn, N. Y.

The Crandall Engineering Co. has contracted

## Business Changes

Swayne & Hoyt, Inc., have moved their Los Angeles office from 488 Pacific Electric Railway building to 703 Transportation building, Seventh and Los Angeles streets.

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The Carolina Co., Charleston, S. C., has been appointed local agent by the Norton-Lilly Co., New York, for the new service by the Isthmian Line to the Orient. The steamer Steel Age will be the first vessel to load at Charleston, leaving in October for Hongkong, Dairen, Shanghai, Yokohama and Kobe.

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The William Constable Co., Providence building, Duluth, now represents the De Laval Steam Turbine Co., Trenton, N. J., having purchased the H. J. Rich Co., the former representative. G. C. Kahl, 404 Dwight building, Kansas City, Mo., has been appointed sales representative of the De Laval company in Arkansas, Nebraska, Kansas and Oklahoma, and parts of Iowa and Missouri. He has had a broad experience in the lines manufactured by the De Laval Steam Turbine Co., including steam turbines, centrifugal pumps and blowers, speed reducing gears, flexible couplings, small water turbines, etc.

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M. E. Galvan & Son, San Francisco, have removed their quarters to Pier 5 from Pier 17. The company handles freight.

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Beatty & Co., Inc., adjusters and insurance brokers, 49 Wall street, New York, announce that Lester Mull has been appointed assistant secretary of the corporation. Mr. Mull is well and favorably known in shipping circles through his previous connections with leading shipping interests, and is the son of J. Harry Mull, president of William Cramp & Sons Ship & Engine Building Co., Philadelphia. He has been associated with Beatty & Co., Inc., for some time past.

with Williams & Manchester, Newport, R. I., for a 500-ton railway drydock. The same company has contracted to build a 100-ton railway drydock for B. F. Wood, Inc., City Island, N. Y. Both are of special design for yacht repair work.

Roosevelt Steamship Co., New York, has ordered another motorship from English builders.

Albert Jensen, New York, has purchased the steamers WISLA from C. E. Gremmels and SAXON from the Clinchfield Navigation Co.

The Washington Tug & Barge Co., Seattle, has purchased the former army tender WILSON, and is converting it into a sea-going tug. Capt. J. C. Brownfield is in charge.

John Ridley, Son & Tully, Newcastle, New South Wales, have contracted with William Pickersgill & Sons, Sunderland, for a 7500-ton deadweight steamer, single deck.

Contracts recently were awarded the Crosby Marine Corp. shipyard on Lake Union, Wash., for a 125-horsepower diesel tug for the Tacoma Tug & Barge Co. The engine is to be constructed by the H. W. Sumner Co., Seattle.

The Atlantic Gulf & Far East Steamship Co., New York, has been incorporated in Delaware with \$1000 nominal capital. The company represents the consolidation of the shipping board services operated by the Barber Steamship Lines and the Tampa Inter-ocean Steamship Co.

Carter Wood Lines, Ltd., has been incorporated to construct and operate steamships and vessels, with \$200,000 capital, by Charles R. McKenzie, Francis G. Bush and Herbert W. Jackson.

The Montreal harbor commission, Montreal, Que., has awarded contracts for constructing a 1200-foot wharfage at Windmill point.

Resort Steamship Co., Inc., has been incorporated in New York with \$10,000 capital, to own and operate excursion lines, vessels, etc.

Steamer Hadnot Corp., New York, has been chartered with \$123,000 capital, to own and operate passenger boats. G. V. Reilly, S. C. Wood and A. R. Myers, are incorporators, represented by Crowell & Rouse, 24 Broad street, as attorneys.

Pastime Navigation Co., New York, has been dissolved.

New York Tank Barge Co. has been formed with \$50,000 capital, to manufacture and sell articles for equipping boats, with W. H. Baldwin, A. Kaufman and R. Klunk, as incorporators. E. R. Kayes, 215 Montague street, Brooklyn, N. Y., is attorney.

Trans-Marine Underwriting Agency, New York, has been dissolved.

Waterway Navigation Co., New York, has been incorporated with \$10,000 capital, by F. J. and J. B. Parks, and E. F. C. Parker. S. Goodman, 130 West Forty-second street, is attorney.

Mott Haven Lighterage Co., Bronx, N. Y., has been chartered with \$10,000 capital, to build ships, by O. C. Stegemann, I. E. Riesick and I. C. Schwalb, with Kadel, Van Kirk & Reynolds, 2804 Third avenue, Bronx, as attorneys.

St. Louis, Tool Die & Mfg. Co., St. Louis, has been incorporated with \$100,000 capital by E. A. Cowdery, L. H. Cowdery, Hal H. Coleman and W. L. McCann, to manufacture and sell automobile and power boat accessories and iron, steel and metal castings. Greensfelder & Grand, Central National Bank building, are attorneys for the new company.